

III. AFFECTED ENVIRONMENT

The primary focus of this section is to provide a baseline condition to assess the location and magnitude of anticipated impacts. The environmental consequences are presented in **Section IV** (Environmental Consequences) and **Section V** (Section 4(f) Evaluation).

A. SOCIAL, ECONOMIC, AND LAND USE

The social, economic, and land use conditions within Montgomery County and the MD 97 study area and vicinity (**Figure I-1** and **Figure I-2**), as discussed below, are based on various sources of information including US Census Bureau data, regional planning data, and local conditions.

1. Social Environment

a. Population Characteristics

Statistical data regarding population demographics was gathered from the US Census Bureau, the M-NCPPC, and the MDP (formerly Maryland Office of Planning, MOP), Planning Data Services.

(1) Montgomery County

According to the 2000 Census, Montgomery County remains the most populous jurisdiction in the State of Maryland and it is the second largest jurisdiction in the Washington Metro region (Fairfax County, VA is first). Montgomery County's population grew to 873,341 persons, a 15.4 percent increase over 1990's total population of 757,027 (**Table III-1**). Montgomery County's growth between 1990 and 2000 (15.4%) outranked the population growth at the national (13.2%) and state (10.8%) level. M-NCPPC estimates that the county population in 2010 will be 975,000, and the 2020 population will be 1,050,000 (M-NCPPC, 2001). The county as a whole is expected to gain population during the next two decades, although the rate of population increase is anticipated to decline after 2020, as depicted in **Figure III-1**.

"Baby boomers" (those born between 1946 and 1964) pushed the median age of county residents from 33.9 in 1990 to 36.8 in 2000 (**Table III-1**). Age distribution data indicated that the groups with the highest percentage of persons in 2000 were the 25 to 54 age group (47.5% of total population); and the under 19 age group (27.2% of total population). The 65 and older age group in 2000 was 11.2 percent of the total population. According to the M-NCPPC population forecast, the percentage of elderly in the county is expected to increase to 12.9 percent in 2010, the brink before baby boomers join the over 65 ranks, and continue upward to 14.9 percent of the total population by 2025 (M-NCPPC, 2001). According to the 2000 Census, 62 homes for the physically handicapped are located within Montgomery County, however, none are located within the project study area.

Racial diversity continues to expand in Montgomery County as the population growth in the County's minority groups exceeds the change in total population between 1990 and 2000. Between these years, minority population grew by 145,439 and total population saw an increase of 116,314 (**Table III-1**). Minorities accounted for 125 percent of the county's population growth in this period, and minorities rose from 27 percent of the total population in 1990 to 40 percent in 2000 (M-NCPPC, 2001).

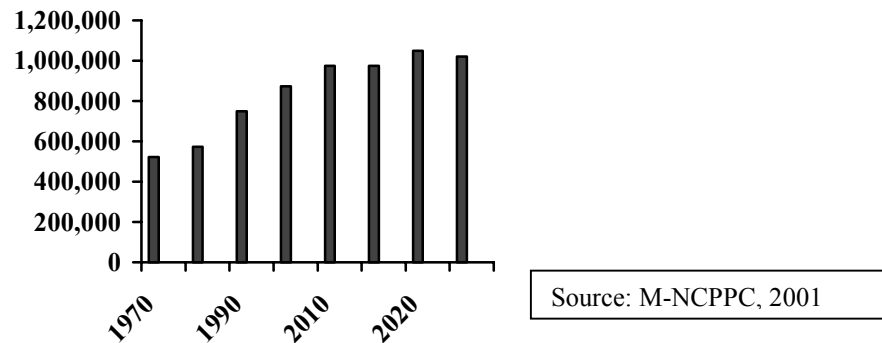
TABLE III-1 Montgomery County Population Characteristics

Category	Population		Percent Change 1990-2000
	1990	2000	
Total Population	757,027	873,341	15.4
Median Age	33.9	36.8	8.6
Under 5 years	57,138	60,173	5.3
5 to 19 years	137,221	178,040	30
20 to 24 years	51,479	43,684	-15.1
25 to 34 years	148,947	126,567	-15.0
35 to 44 years	133,794	155,708	16.4
45 to 54	88,855	132,870	49.5
55 to 59	32,056	45,652	42.4
60 to 64 years	30,046	32,490	8.1
65 years and over	77,491	98,157	27
Race			
<i>One race</i>	757,027	843,224	11.4
White	580,635	565,719	-2.6
Black or African American	92,267	132,256	43.3
American Indian and Alaska Native	1,841	2,544	38.2
Asian	61,654	98,651	60.0
Native Hawaiian and Other Pacific Islander	327	412	26.0
Some other Race	20,303	43,642	115.0
<i>Two or more races</i> ¹	NA	30,117	NA
<i>Race alone or in combination with one or more other races:</i> ¹			
White	NA	587,681	NA
Black or African American	NA	142,507	NA
American Indian or Alaska Native	NA	6,639	NA
Asian	NA	107,785	NA
Native Hawaiian and Other Pacific Islander	NA	1,492	NA
Some other Race	NA	59,421	NA
Hispanic or Latino and Race			
Hispanic or Latino (of any race)	55,684	100,604	80.7
Mexican	4,886	8,917	82.5
Puerto Rican	3,934	5,319	35.2
Cuban	3,005	2,739	-8.9
Other Hispanic or Latino	43,859	83,629	90.7
Educational Attainment			
Population 25 years and older	512,839	594,034	15.8
Less than 9 th grade	19,937	25,877	29.8
9 th to 12 th grade, no diploma	28,355	31,599	11.4
High school graduate (includes equivalency)	85,907	86,009	0.1
Some college, no degree	94,332	99,098	5.1
Associate Degree	28,177	27,371	-2.9
Bachelor's Degree	137,105	160,754	17.2
Graduate or professional degree	119,026	163,326	37.2

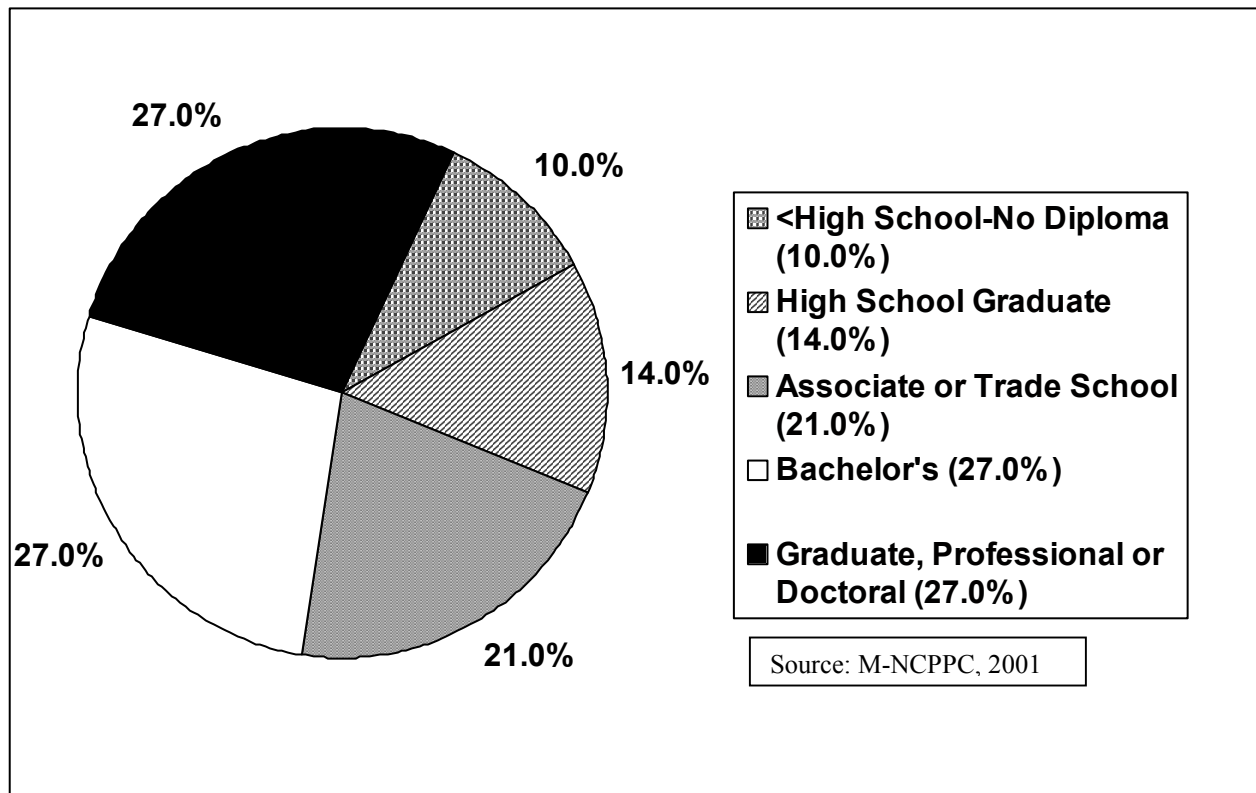
Source: US Census Bureau, 1990 and 2000 Census of Population;
MDP, Planning Data Services, May 2001, *General Population Characteristics*

NA Not available

¹ Census 2000 terminology/categories are used for race data. Because individuals could only report one race in Census 1990 and could report one or more races in Census 2000, data on race for 1990 and 2000 are not comparable.

FIGURE III-1 Montgomery County Population

Montgomery County has a high percentage of adults who obtained a higher level of education (**Table III-1**); 55 percent of the county's population 25 years or older has a Bachelor's degree or higher (M-NCPPC, 2001) (**Figure III-2**).

FIGURE III-2 Montgomery County Educational Attainment (Age 25+) - 2000

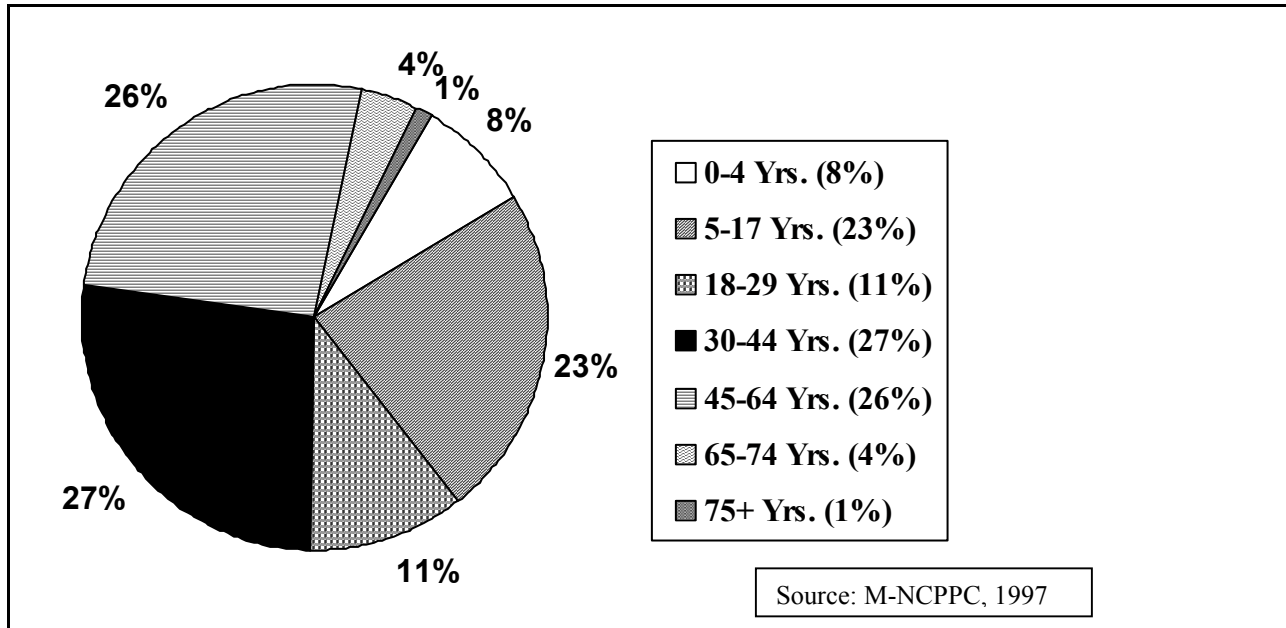
(2) Olney and Vicinity Planning Area

The project area (**Figure I-2**) is located within a portion of the Olney and Vicinity Planning Area (Planning Area 23) (**Figure III-4**). This planning area is 46.9 square miles, and is the largest single planning area in the county with regards to land acreage (M-NCPPC, 1997).

For this analysis, the M-NCPPC 1997 Census Update Survey Data was used for the Olney and Vicinity Planning Area because the US Census Bureau does not compile data for Planning Areas. US Census Bureau level data do not match M-NCPPC Planning Area Boundaries.

In 1997, the total population for the Olney and Vicinity Planning Area was 33,290 persons, with the majority of the population's age distribution being between the ages of 30 and 64 (53%). The 5 to 17 age group was the second highest with 23 percent of the total planning area population. The under 5 age group comprised 7.6 percent; and the 65 and over age group totaled 5.3 percent of the planning area population (**Figure III-3**) (M-NCPPC, 1997).

FIGURE III-3 Olney and Vicinity Planning Area Population By Age Group – 1997

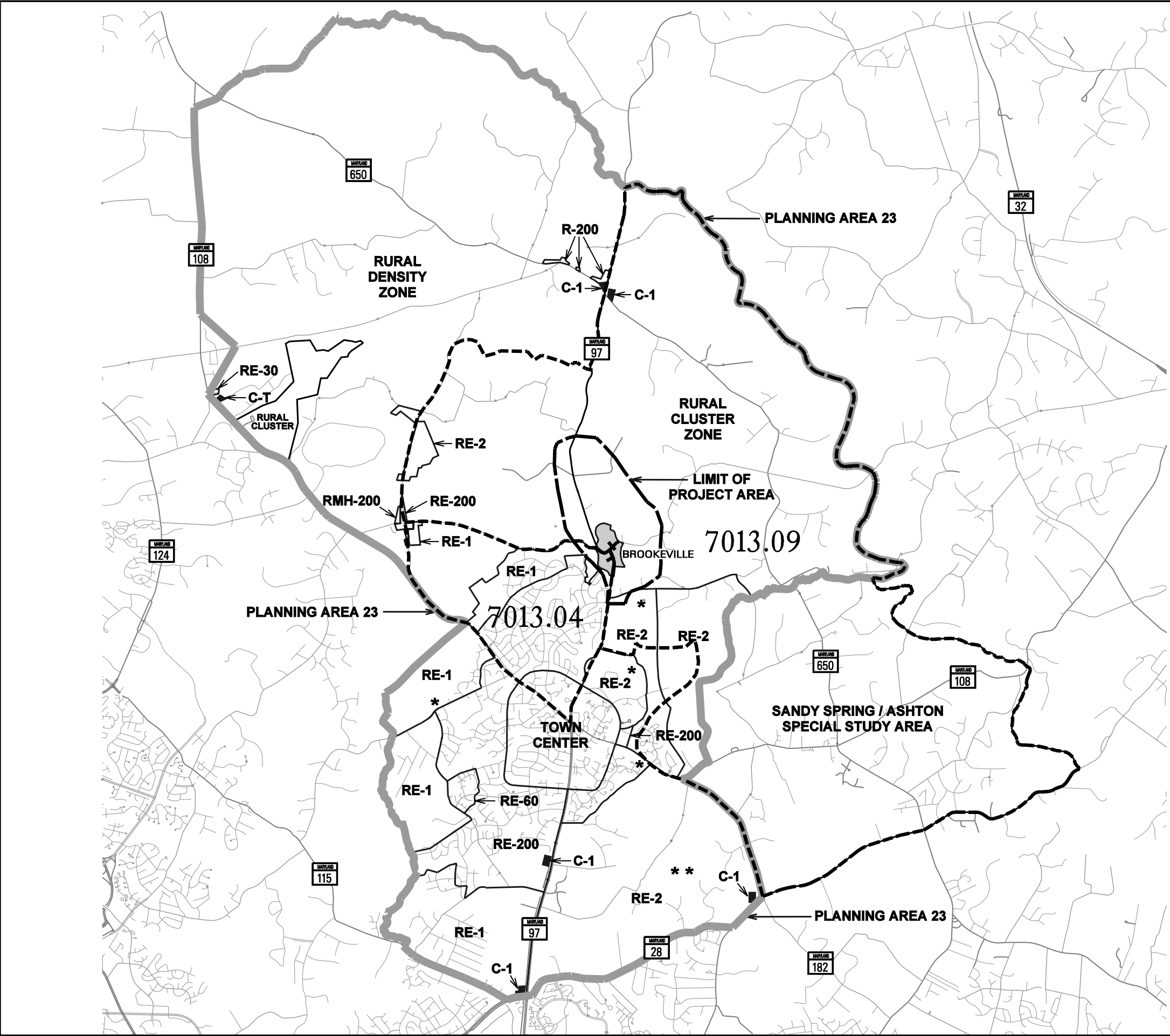


In 1997, the Olney and Vicinity Planning Area had a 7.4 percent Black/African American population, 6.8 percent Asian or Pacific Islander population, and 1.4 percent "Other" races. The "Other" number was derived from American Indians and write-in entries such as multi-racial, multi-ethnic, or Hispanic origin groups (M-NCPPC, 1997). The population of Hispanic origin was 5.3 percent of the total county population. In comparison to the county's ethnic population figures, this planning area's percentages for Black/African American, Asian, and Hispanic Origin groups were less than the county's corresponding figures.

In 1997, the educational attainment of the Olney and Vicinity Planning Area population aged 25 and older consisted of the following: 6.9 percent had less than a high school diploma; 30.5 percent had a high school diploma; 4.9 percent attended an associate or trade school; 28.8 percent had a bachelor's degree; and 28.8 percent had a graduate, professional, or doctoral degree (M-NCPPC, 1997).

(3) Census Tracts 7013.04 and 7013.09

According to the US Census Bureau, the Town of Brookeville is partially divided between two Census Tracts, 7013.04 and 7013.09. The dividing line between these two tracts is Brookeville Road and MD 97 from the Town of Brookeville south to MD 108 (**Figure III-4** and **Figure III-5**). **Table III-2** lists general population characteristics for Census Tracts 7013.04 and 7013.09.



Map Legend

- Planning Area Boundary
- Limit of Project Area
- Census Tract Boundary
- Brookeville Town Corporate Limits

Source Legend

- * Transfer Development Rights (TDR) Receiving Area
- RE-2 Residential Estate, 2 Acre (2 acres per dwelling unit)
- RE-1 Residential Estate, 1 Acre (40,000 square feet per dwelling unit)
- R-200 One-Family Detached, Large Lot (20,000 square feet per dwelling unit)
- R-60 One-Family Detached Residential (6,000 square feet per dwelling unit)
- C-1 Local Commercial
- RMH-200 One-Family Detached (20,000 square feet) Single-wide mobile home option
- C-T Commercial Transitional
- R-30 Multi-Family Residential

Rural Density Transfer Zone
One lot per 20 acres; option to sell development rights

Rural Cluster Zone
One lot per 5 acres

Source: Olney Master Plan approved and adopted June, 1980. Montgomery County, Maryland

MD 97 BROOKEVILLE PROJECT
FINAL ENVIRONMENTAL IMPACT STATEMENT
SECTION 4(f) EVALUATION

PLANNING AREA 23
OLNEY, MARYLAND & VICINTY

6000 0 6000
SCALE IN FEET

FIGURE
III-4

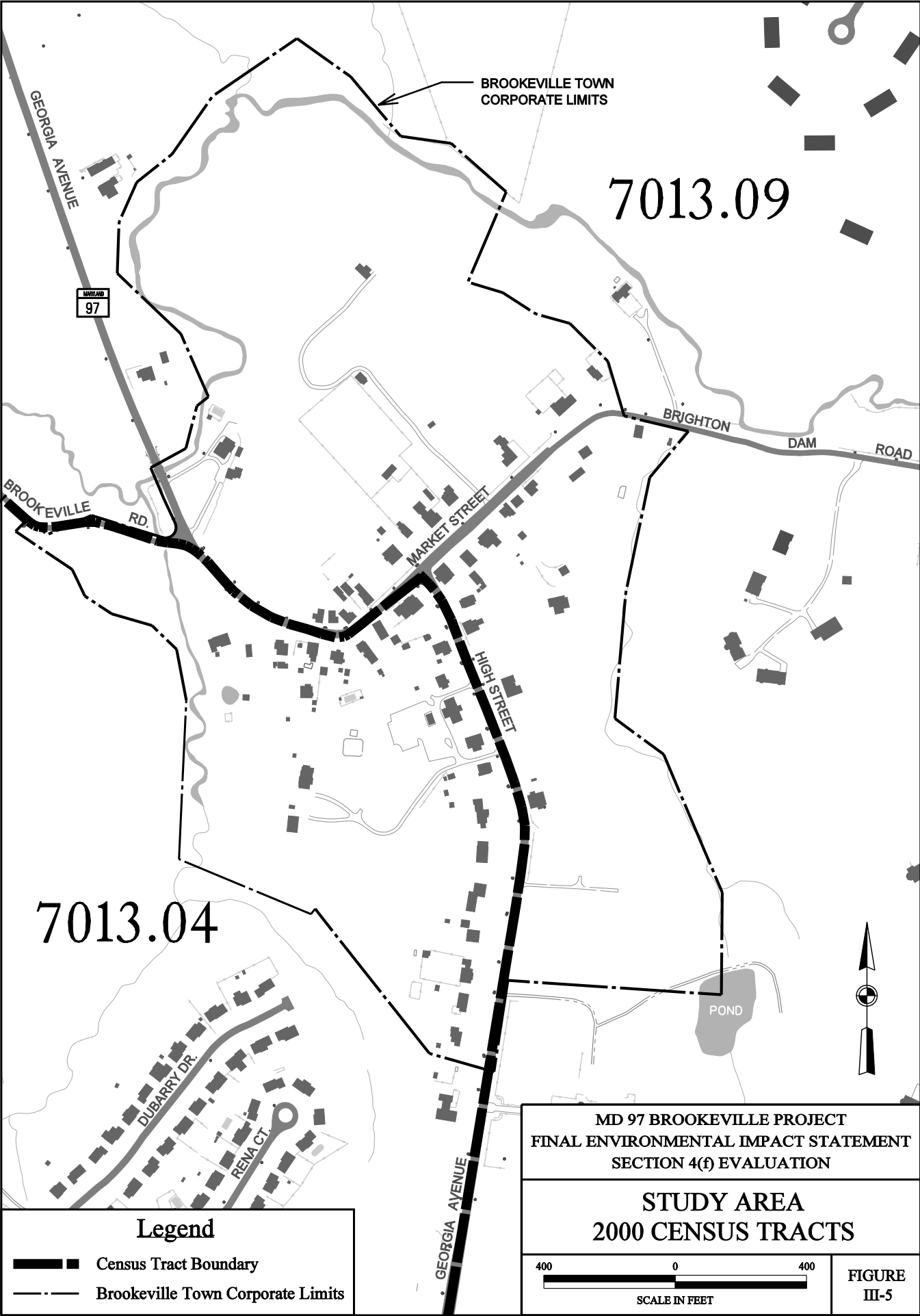


TABLE III-2 Census Tracts 7013.04 and 7013.09 Population Characteristics

Category	Census Tract 7013.04		Percent Change	Census Tract 7013.09		Percent Change
	1990	2000		1990	2000	
Total Population	6,870	6,146	-10	5,214	8,690	67
Median Age	38.3	41.1	7	36.8	39.1	6
Under 5 years	457	337	-26	300	314	5
5 to 19 years	1,793	1,458	-19	1,009	2,107	109
20 to 24 years	454	227	-50	233	250	7
25 to 34 years	719	474	-34	768	722	-6
35 to 44 years	1,366	996	-27	851	1,683	98
45 to 54	1,347	1,199	-11	813	1,393	71
55 to 59	269	589	119	287	495	72
60 to 64 years	202	372	84	229	331	44
65 years and over	263	494	88	724	1,085	50
Race						
<i>One race</i>	NA	6,044	NA	NA	8,501	NA
White	6,171	5,410	-12	4,674	6,914	48
Black or African American	366	315	-14	587	932	59
American Indian and Alaska Native	18	17	-6	3	14	367
Asian	289	246	-15	119	536	350
Native Hawaiian and Other Pacific Islander	6	3	-50	0	1	NA
Some other Race	26	53	104	33	104	215
<i>Two or more races</i> ¹	NA	102	NA	NA	189	NA
<i>Race alone or in combination with one or more other races:</i> ¹						
White	NA	92	NA	NA	127	NA
Black or African American	NA	8	NA	NA	24	NA
American Indian or Alaska Native	NA	0	NA	NA	9	NA
Asian	NA	2	NA	NA	24	NA
Native Hawaiian and Other Pacific Islander	NA	0	NA	NA	0	NA
Some other Race	NA	0	NA	NA	0	NA
Hispanic or Latino and Race ²						
Hispanic or Latino (of any race)	211	223	6	99	352	256
Mexican	32	38	19	20	115	475
Puerto Rican	28	30	7	9	39	333
Cuban	35	36	3	16	30	88
Other Hispanic or Latino	116	119	3	54	69	28
Educational Attainment						
Population 25 years and older	4,166	4,096	-2	3,672	5,738	56
Less than 9 th grade	54	38	-30	131	191	46
9 th to 12 th grade, no diploma	195	93	-52	248	197	-21
High school graduate (includes equivalency)	816	699	-14	753	952	26
Some college, no degree	995	911	-8	725	927	28
Associate Degree	205	208	-1	142	217	53
Bachelor's Degree	1,185	1,279	8	917	1,657	81
Graduate or professional degree	716	359	-50	756	1,597	111

Source: US Census Bureau, 1990 and 2000 Census of Population; MDP, Planning Data Services, May 2001, *General Population Characteristics*

NA Not available

¹ Census 2000 terminology/categories are used for race data. Because individuals could only report one race in Census 1990 and could report one or more races in Census 2000, data on race for 1990 and 2000 are not comparable.

(4) Town of Brookeville

According to the 2000 Census, the total population for the Town of Brookeville was 120 persons (Table III-3). The median age in Brookeville was 39.3 years, with the majority of the Town's population in the 35-44 age group (21.7% of total town population).

TABLE III-3 Town of Brookeville Population Characteristics

Category	Population		Percent Change 1990-2000
	1990	2000	
Total Population	54	120	122
Median Age	36.7	39.3	7
Under 5 years	7	9	29
5 to 19 years	10	25	150
20 to 24 years	4	6	50
25 to 34 years	7	10	43
35 to 44 years	11	26	136
45 to 54	7	18	157
55 to 59	1	7	600
60 to 64 years	3	7	133
65 years and over	4	12	200
Race			
<i>One race</i>	54	118	118
White	52	117	125
Black or African American	0	0	0
American Indian and Alaska Native	0	0	0
Asian	1	0	-100
Native Hawaiian and Other Pacific Islander	0	0	0
Some other Race	1	1	0
<i>Two or more races</i> ¹	NA	2	NA
<i>Race alone or in combination with one or more other races:</i> ¹			
White	NA	119	NA
Black or African American	NA	0	NA
American Indian or Alaska Native	NA	2	NA
Asian	NA	0	NA
Native Hawaiian and Other Pacific Islander	NA	0	NA
Some other Race	NA	1	NA
Hispanic or Latino and Race			
Hispanic or Latino (of any race)	1	3	200
Mexican	1	0	-100
Puerto Rican	0	1	NA
Cuban	0	0	0
Other Hispanic or Latino	0	2	NA
Educational Attainment			
Population 25 years and older	33	73	121
Less than 9 th grade	5	0	-100
9 th to 12 th grade, no diploma	2	5	150
High school graduate (includes equivalency)	2	13	550
Some college, no degree	4	9	125
Associate Degree	1	1	0
Bachelor's Degree	15	19	27
Graduate or professional degree	5	26	420

Source: US Census Bureau, 1990 and 2000 Census of Population; MDP, Planning Data Services, May 2001, *General Population Characteristics*

NA Not available

¹ Census 2000 terminology/categories are used for race data. Because individuals could only report one race in 1990 and could report one or more races in Census 2000, data on race for 1990 and 2000 are not comparable.

b. Environmental Justice

Executive Order 12898 (*Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*), issued on February 11, 1994, requires federal agencies to administer and implement programs, policies, and activities that affect human health or the environment so as to identify and avoid “disproportionately high and adverse” effects on minority and low-income populations. Minority is identified as “individual(s) who are members of the following population groups: American Indian or Alaskan Native, Asian or Pacific Islander, Black/African American (not of Hispanic origin), or Hispanic.” Also, low-income populations “should be identified with the annual statistical poverty thresholds from the Bureau of the Census’ Current Population Reports, Series P-60 on Income and Poverty.” These population groups are to be provided public information and an opportunity to participate in the project development process.

Brookeville is a rural area that is not heavily populated, having a population of only 120 people in 2000. The census tracts that encompass the project area and the Town of Brookeville (**Figure III-4**) have a low percentage of minorities (**Table III-2** and **Table III-3**). Contact with Salem United Methodist Church revealed a very low percentage of these population groups in their membership. No minority groups were visually identified in the project area during field visits. Montgomery County recreation officials have indicated a recent increase in the ethnic diversity of users at the Longwood Community Center, located in the study area (Montgomery County of Recreation, 2001). Community outreach efforts will continue, as the project transitions into the final design phase.

According to the Department of Health and Human Service (DHHS), two percent of the families in Census Tract 7013.04 were below the poverty level in 1999, and one percent was below the poverty level in Census Tract 7013.09. According to DHHS, the Town of Brookeville was identified as having two families and six individuals having poverty status in 1999.

New development, occurring primarily to the east of Brookeville, consists of large single family houses on lots approximately two acres in size. The median household income for Brookeville is \$88,629, which is well above the state level of \$52,868.

c. Neighborhoods

Brookeville remains a small town consisting of approximately 52 buildings (Brookeville Planning Commission, 1994) and 120 residents (US Census Bureau, 2000). In general, the Brookeville residences are two-story brick single-family detached units on half acre or two acre lots, with a few smaller bungalow or cottage-style homes along MD 97. The historic Brookeville Academy, which served as a boys’ school in the early 19th century, now houses local government offices, with future anticipated use as a community facility for the general public of Brookeville.

The major north-south thoroughfare in this small town is MD 97 (Georgia Avenue), which links the various communities along the corridor. East-west traffic travels mainly along Brookeville Road and Brighton Dam Road coming in and going out of Brookeville. A sidewalk exists on the north side of the MD 97 and Brighton Dam Road intersection.

The neighborhoods in the project area are located on **Figure III-6**. The Town of Brookeville is located in the center of the project area. The Holiday Hills residential subdivision is at the northern end of the project area and the Olney Mill Community is situated to the west. Sunnymeade is a small cluster of homes along Brighton Dam Road just east of town. The homes, built throughout the 1990's, share a private entrance off of Brighton Dam Road. South of Sunnymeade, four new homes are being constructed, which will also share a private entrance off of Brighton Dam Road.

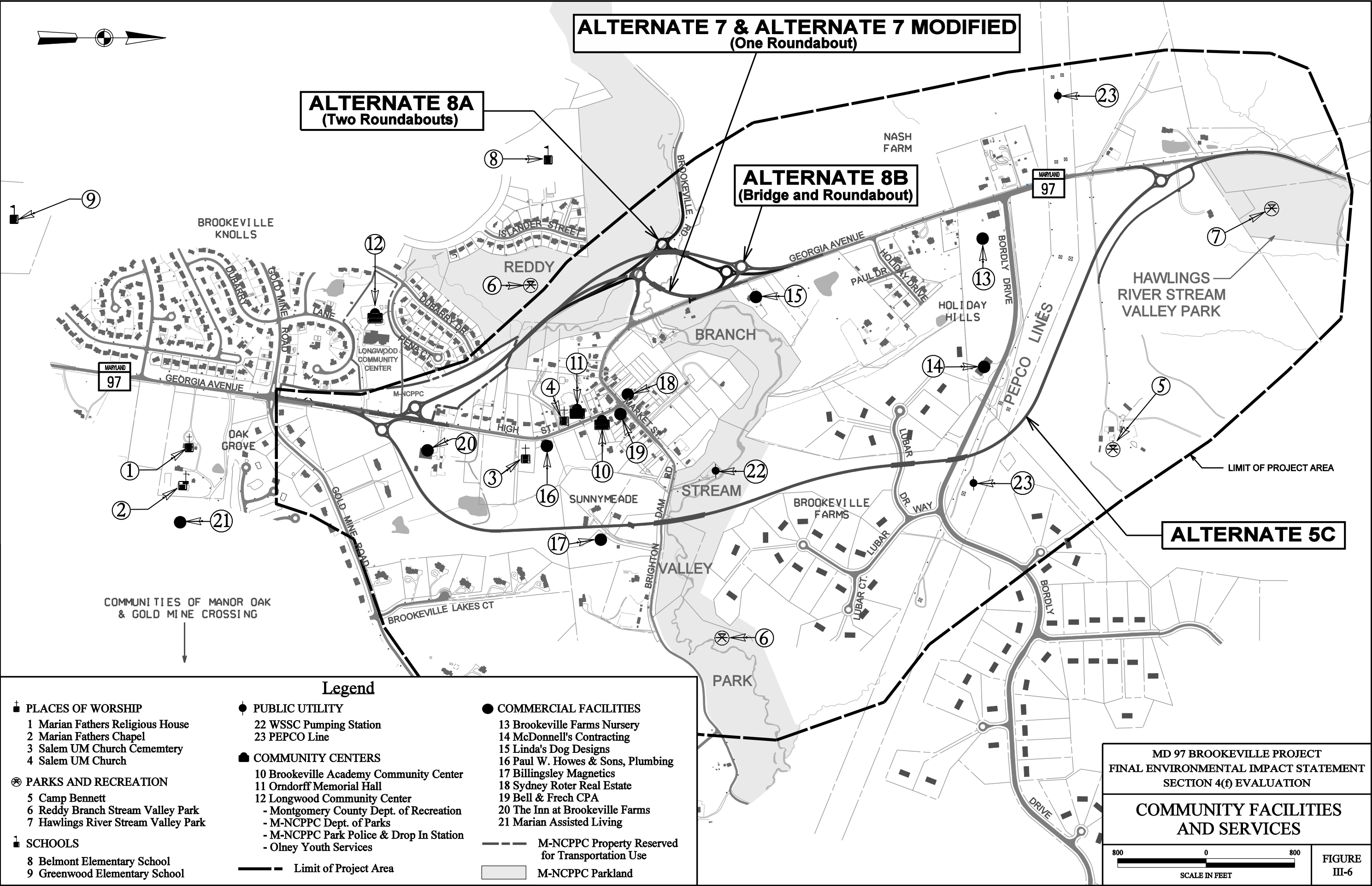
There are three established residential developments, Manor Oak, Oak Grove, and Gold Mine Crossing, south of Gold Mine Road and east of MD 97, which is southeast of the project area. Holiday Hills is a very small community of single-family detached homes on Holiday Drive and Paul Drive. These are mostly two-story dwellings with a few ranch-style homes. Much of the property in this subdivision is undeveloped at this time. Olney Mill is an established community north of Olney and west/southwest of the project area (Brookeville Knolls, part of Olney Mill, is the closest neighborhood to the Town of Brookeville). Olney Mill, including Brookeville Knolls, is comprised of single-family detached homes built in the 1970's. Most of these are two-story colonial or bi-level style homes. This community appears to have a high level of cohesion because there is a pathway along MD 97 for pedestrian/bicycle traffic and two facilities, the Belmont Elementary School and the Longwood Community Center, within the neighborhood that promote community interaction. These two facilities are located in the north and east sections of the neighborhood, respectively and are discussed further in the "Community Facilities and Services" section of this document. Homes are currently being constructed in the new Oak Grove subdivision, at the southern end of the project area. This residential development is comprised of large executive-style homes.

In the center of the Town of Brookeville, at the intersection of Market Street and High Street, three new houses are being constructed. These homes, located behind Sydney Roter Real Estate, will share a private entrance off of Market Street.

In 1984, a Citizen's Planning Committee was formed to provide planning guidance to the Town Commissioners. Brookeville's Comprehensive Plan, adopted in 1994, was completed with considerable input from the citizens. As evidenced in the Comprehensive Plan, pedestrian and vehicular circulation patterns are an important aspect of the community of Brookeville. The village circulation system is addressed in the plan, with goals to maintain green space and fence rows; provide public access to planned public space, in particular the Reddy Branch Stream Valley Park; and incorporate the historic streetscape pattern of the town into plans for any future road improvements to serve the existing community and future development (Brookeville Planning Commission, 1994).

d. Community Facilities and Services

Information regarding community facilities was obtained through field visits to the project area and a review of county and local mapping. Community facilities and services in the project area and vicinity are located on **Figure III-6**. As shown, several facilities are located outside the project limits but still serve the citizens of the area. ADA compliance as it relates to pedestrian accessibility will be considered by SHA during final design.



(1) Educational Facilities

There are no educational facilities directly within the project area; however, buses from local schools transport students along MD 97 throughout the project area. Students travel MD 97 on four buses to Greenwood Elementary School located on Gold Mine Road, southeast of the project area **(Figure III-6)**. Elementary school students in the project area also attend Belmont Elementary School, located in the northern portion of the Olney Mill community; however, buses traveling to Belmont do not use MD 97, according to the Montgomery County Public Schools' Transportation Division. Middle school students in the project area attend either Rosa M. Parks Middle School or William H. Farquhar Middle School, both located outside the project area. One bus travels on MD 97 in Brookeville to Rosa M. Parks; buses traveling to William H. Farquhar do not use MD 97. Students of high school age attend Sherwood High School, southeast of the project area along MD 108 in Ashton. Three buses use MD 97 in the project area transporting students to and from Sherwood High School (Interview with Beverly Love, 2001).

(2) Religious Facilities

The Salem United Methodist Church is the only religious facility directly within the project area **(Figure III-6)**. The church is located on the west side of MD 97 at its intersection with Church Street. Just south of Gold Mine Road on the east side of MD 97 is the Marian Fathers Novitiate, which functions as a retreat facility and as a regional conference center **(Figure III-6)**. Camp Bennett, located north of Holiday Drive, is privately owned and operated by the Central Union Mission **(Figure III-6)**. Throughout the year, Camp Bennett functions as a recreational retreat facility for inner city youth and for church groups from various denominations, as well as a substance abuse rehabilitation center (Interview with Chaplain Steve Hoey, 2001).

(3) Health Care Facilities

There are no hospitals or medical facilities in the immediate project area. The closest medical facility is the Brooke Grove Health Center located approximately 7.5 mile southeast of the project area on Marden Lane, which is off of MD 108. The Sharon Nursing Home is also on Marden Lane in the immediate vicinity of the Brooke Grove Health Center. Montgomery General Hospital is located approximately 1.3 miles southeast of the project area, on MD 108.

(4) Emergency Services

The Brookeville area is serviced by the Wheaton-Glenmont District of the Montgomery County Police, located in Glenmont approximately 8.7 miles south of Brookeville. The closest police station is located in Olney, approximately 0.28 miles west of the MD 97/MD 108 intersection, outside of the project area limits. The Sandy Spring Fire and Rescue Company No. 40, located on MD 97 about 1.4 miles south of the MD 97/MD 108 intersection, covers the Brookeville area.

(5) Recreational Facilities and Parks

Three publicly owned public recreational facilities are located within the project area: Reddy Branch Stream Valley Park, Longwood Community Center, and Hawlings River Stream Valley Park. Reddy Branch Stream Valley Park is administered by M-NCPPC and is a conservation park with no active recreational facilities existing or proposed **(Figure III-6)**. Passive recreation activities are allowed throughout the park property. Hiking and other nature-oriented activities are also allowed even though the park does not maintain a trail system.

Longwood Community Center is owned by Montgomery County and maintained by the Montgomery County Department of Recreation. Shared use includes the M-NCPPC Department of Parks, the M-NCPPC Park Police and Drop-In Station, and the Olney Youth Services. The recreational facility includes a soccer field with two baseball diamonds adjacent to MD 97, two tennis courts behind the building, and picnic tables in the front portion of the property under the trees. There is a recreational building for indoor activities, including basketball, volleyball, aerobics and weight training/exercise classes, and various activities for seniors, children, teens, and adults. The center was originally acquired in a joint effort between the county and the community. The community raised approximately 140 percent of their agreed upon amount of funding required to finance the acquisition and establishment of the facility.

According to the 1980 Olney Master Plan, the baseball/softball field is located on property that is presently leased by the Longwood Community Center but is owned by M-NCPPC and has been designated for transportation use in anticipation of the future improvements to MD 97 (M-NCPPC, 1980). The area designated for transportation use was factored into the plan for the recreational facility at the time it was being developed for recreational and community uses (**Figure III-6**).

Hawlings River Stream Valley Park is part of Montgomery County's multi-jurisdictional regional conservation system (**Figure III-6**). It totals 554 acres and is located at the north end of the project area, primarily east of the project area where it joins with the Reddy Branch Stream Valley Park.

Camp Bennett is also located in the project area at the northern end of the project limits. As previously mentioned, this facility is privately owned and operated. It is open to church groups of various denominations, as well as inner city youth associated with their ministry program, as a retreat center. Recreational opportunities include camping, swimming, hiking, volleyball, softball, and basketball. Accommodations at the facility include four dormitory style cabins to house up to 64 people, a dining room, meeting room, and chapel (Interview with Chaplain Steve Hoey, 2001).

(6) Civic and Quasi-Public Facilities

The Brookeville Academy Community Center, at which the Town Office and archives are located, is the only civic facility in the project area (**Figure III-6**). It also has general-purpose rooms and rental facilities for community meetings, lectures, and non-profit groups (Allan, 2001). The closest libraries for residents in the project area are the Olney Branch of the Montgomery County Public Library and the Rockville Regional Library.

(7) Utilities

Electricity in the project area is provided by the Potomac Electric Power Company (PEPCO). Municipal water and sewer services are provided throughout Brookeville and the surrounding area by the Washington Suburban Sanitary Commission (WSSC). According to the Montgomery County Department of Water and Waste Management, there is a pumping station in Brookeville. Few homes still use private well and septic systems in the vicinity. Verizon (formerly Bell Atlantic) is the primary telephone service provider and Montgomery Cable TV provides cable service to project area residents.

2. Economic Environment

Information regarding the economic environment in Montgomery County and the Town of Brookeville was obtained from the US Census Bureau, the Maryland Department of Licensing and Labor Relations, and the M-NCPPC.

a. Employment Characteristics

Table III-4 identifies the employment characteristics for Montgomery County and the Town of Brookeville. **Table III-5** lists income and poverty information for the county and Brookeville.

(1) Montgomery County

Job growth in Montgomery County was strong during the late 1990s and into the beginning of this decade. Estimates based on data from the Maryland Department of Licensing and Labor Relations show that yearly job growth has ranged from 14,700 to 27,000 jobs from 1997 to 2000 (M-NCPPC, 2003).

In Montgomery County, the numbers of workers residing and working in the same jurisdiction in 2000 was 455,331. In 2000, the Montgomery County population 16 years and over in the labor force was 477,123. This indicates that the majority of Montgomery County workers reside and work in Montgomery County.

The federal government is a major component of Montgomery County's economy. It is an employer, a tenant and landowner, and a purchaser of goods and services. As an employer, almost 60,000 workers are in federal employment, and the federal government is a major source of income for Montgomery County residents and workers in the county. During fiscal year 2000, the federal government paid workers in the county \$3.2 billion in wages and salaries. It also paid county residents \$2.5 billion in direct payments to individuals for retirement and other benefit programs (M-NCPPC, 2003). **Table III-4** lists the various employment sector categories and the number of persons employed within each. According to the 2000 Census, approximately 80 percent of the residents of Census Tracts 7013.04 and 7013.09 work within the State of Maryland and of these, 64 percent work within Montgomery County. **Table III-4** identifies the employment characteristics for Montgomery County and the Town of Brookeville.

(2) Town of Brookeville

Commercial facilities within the project area are located on **Figure III-6**. From north to south, these include the seasonal Brookeville Farms Nursery along MD 97, and McDonnell Contracting located to the rear of the nursery at the northern end of the project area, on the east side of MD 97 (**Figure III-6**). Further south on the east side of MD 97 in Brookeville is a pet grooming shop, Linda's Dog Designs. There are also three small businesses in town including a realtor, a certified public accountant, and a plumbing company. The Inn at Brookeville Farms and the Marian Assisted Living Facility are located along the southern portion of the project area.

TABLE III-4 Employment Characteristics - 2000

Category	Montgomery County		Town of Brookeville	
	Number	Percent	Number	Percent
Employment Status				
Population 16 years and over	675,119	100	79	100
In Labor Force	477,123	70.7	57	72.2
Civilian labor force	473,851	70.2	57	72.2
Employed	458,824	68	57	72.2
Unemployed	15,027	2.2	0	0
Armed Forces	3,272	0.5	22	27.8
Not in Labor Force	197,996	29.3	22	27.8
Commuting to Work				
Workers 16 years and over	455,331	100	57	100
Car, truck, or van – drove alone	313,935	68.9	36	63.2
Car, truck, or van – carpooled	49,802	10.9	7	12.3
Public Transportation (including taxicab)	57,528	12.6	0	0
Walked	8,806	1.9	6	10.5
Other means	3,324	0.7	0	0
Worked at Home	21,936	4.8	8	14.0
Mean travel time to work	32.8	NA	30.2	NA
Employed civilian population ≥16 years	458,824	100	57	100
Occupations				
Management, professional, and related	259,774	56.6	32	56.1
Service	52,848	11.5	10	17.5
Sales and office	100,859	22.0	9	15.8
Farming, fishing, and forestry	403	0.1	0	0
Construction, extraction, and maintenance	23,986	5.2	5	8.8
Production, transportation, and material moving	20,954	4.6	1	1.8
Industry				
Agriculture, forestry, fishing and hunting, mining	920	0.2	0	0
Construction	23,240	5.1	7	12.3
Manufacturing	19,536	4.3	0	0
Wholesale trade	7,081	1.5	0	0
Retail trade	41,078	9.0	2	3.5
Transportation and warehousing, and utilities	11,562	2.5	0	0
Information	26,677	5.8	3	5.3
Finance, insurance, real estate, rental and leasing	37,016	8.1	3	5.3
Professional, scientific, management, administrative, and waste management services	89,884	19.6	7	12.3
Educational, health and social services	91,357	19.9	15	26.3
Arts, entertainment, recreation, accommodation and food services	31,645	6.9	5	8.8
Other services (except public administration)	32,522	7.1	8	8.8
Public administration	46,306	10.1	10	17.5
Class of Worker				
Private wage and salary workers	326,975	71.3	35	61.4
Government workers	99,644	21.7	15	26.3
Self-employed workers in own not incorporated	31,322	6.8	7	12.3
Unpaid family workers	883	0.2	0	0

Source: US Census Bureau, Census 2000;
Maryland Department of Labor, Licensing and Regulation, 2002;
M-NCPPC, Research and Technology Center, 2002

NA Not applicable

TABLE III-5 Income and Poverty - 2000

Category	Montgomery County		Town of Brookeville	
	Number	Percent	Number	Percent
Income in 1999				
Households	324,940	100	40	100
Less than \$10,000	12,040	3.7	3	7.5
\$10,000 to \$14,999	8,046	2.5	0	0
\$15,000 to \$24,999	18,325	5.6	1	2.5
\$25,000 to \$34,999	24,406	7.5	0	0
\$35,000 to \$49,999	41,248	12.7	7	17.5
\$50,000 to \$74,999	65,955	20.3	4	10.0
\$75,000 to \$99,999	49,573	15.3	11	27.5
\$100,000 to \$149,000	56,565	17.4	2	5.0
\$150,000 to \$199,999	24,199	7.4	5	12.5
\$200,000 or more	24,583	7.6	7	17.5
Medium household income (dollars)	71,551	NA	88,629	NA
With earnings	283,214	87.2	36	90
Mean earnings	89,643	NA	129,417	NA
With Social Security Income	60,754	18.7	10	25
Mean Social Security Income (dollars)	11,531	NA	8,790	NA
With Supplemental Security Income	6,426	2.0	0	0
Mean Supplemental Security Income (dollars)	6,396	NA	0	NA
With public assistance income (dollars)	4,258	1.3	0	NA
Mean public assistance income (dollars)	3,222	NA	0	NA
With retirement income	56,332	17.3	7	17.5
Mean retirement income	31,195	NA	20,843	NA
Families	226,024	100	28	100
Less than \$10,000	5,199	2.3	2	7.1
\$10,000 to \$14,999	3,739	1.7	0	0
\$15,000 to \$24,999	9,813	4.3	1	3.6
\$25,000 to \$34,999	12,998	5.8	0	0
\$35,000 to \$49,999	23,878	10.6	3	10.7
\$50,000 to \$74,999	42,908	19.0	4	14.3
\$75,000 to \$99,999	37,379	16.5	7	25.0
\$100,000 to \$149,000	46,905	20.8	1	3.6
\$150,000 to \$199,999	21,122	9.3	4	14.3
\$200,000 or more	22,083	9.8	6	21.4
Medium family income (dollars)	84,035	NA	93,444	NA
Poverty Status in 1999	No. below poverty level	% below poverty level	No. below poverty level	% below poverty level
Families	8,428	3.7	2	7.1
Families with female householder, no husband present	3,755	11.5	2	40
Individuals	47,024	5.4	6	5.5
≥ 18 years	33,508	5.2	5	6.7
≥ 65 years	5,467	5.9	3	25

Source: US Census Bureau, Census 2000;
Maryland Department of Labor, Licensing and Regulation, 2002;
M-NCPPC, Research and Technology Center, 2002

NA Not applicable

Taxes for residents within the project area include a real property tax rate of \$0.75 per \$100 for Montgomery County and \$0.08 per \$100 for the state of Maryland. Within the project area, residents of Brookeville have a property tax of \$0.19 per \$100, which is paid to the county, and then the Town of Brookeville is reimbursed (Montgomery County, 2002). Other taxes include a state sales tax of five percent on retail sales, business personal property tax rate of \$1.89 per \$100 for Montgomery County; state corporate income tax of seven percent on net income attributable to business transacted within Maryland; state personal income tax which is a graduated tax rate peaking at 4.85 percent of taxable income in excess of \$3,000; and Montgomery County personal income tax of 2.90 percent of the taxable income.

Compared to the rest of the nation, Maryland is a wealthy state, with statewide measures of high incomes and low poverty. The US Census Bureau's Supplemental Survey from 1990 to 2000 has revealed that Maryland is more diverse, better educated, and wealthier than 10 years ago. Maryland is one of the top four states in median income. Being a high-income state, Maryland also has a relatively low level of poverty. Estimates from the 2000 Supplemental Survey list Maryland's overall poverty rate at 9.3 percent, substantially below the national rate of 12.5 percent, and tied for ninth lowest in the Nation (US Census Bureau, 2002).

Montgomery County's poverty rate in 2000 was 5.4 percent (MDP, 2002). The median household income for Montgomery County in 2000 was \$71,551, compared to the state level of \$52,868. For Brookeville, the poverty rate in 2000 was 5.5 percent, and the median household income was \$88,629.

3. Land Use

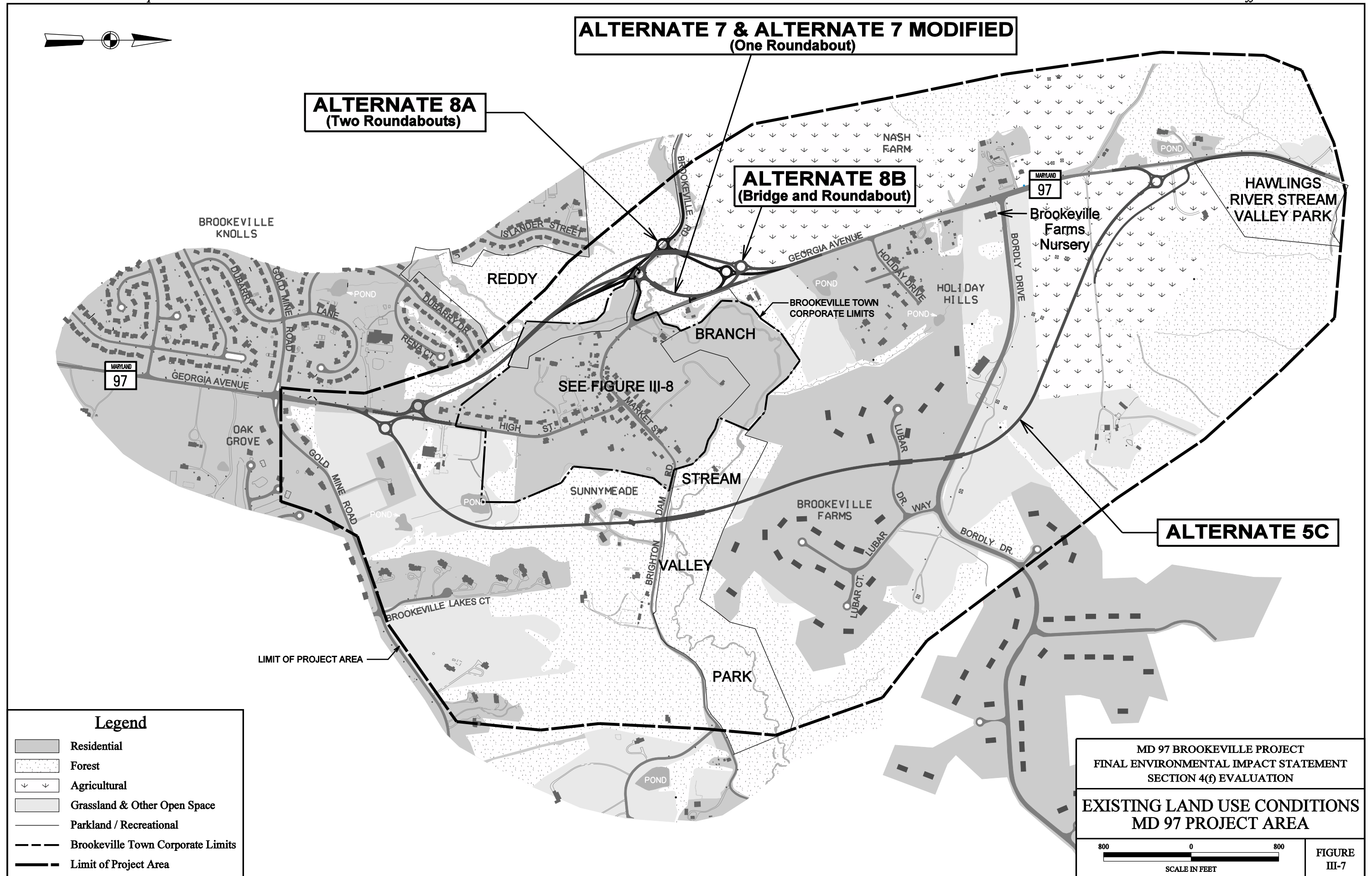
Information on existing, proposed, and planned land use, and comprehensive planning was gathered through available county and municipal planning documents, and interviews with planning officials.

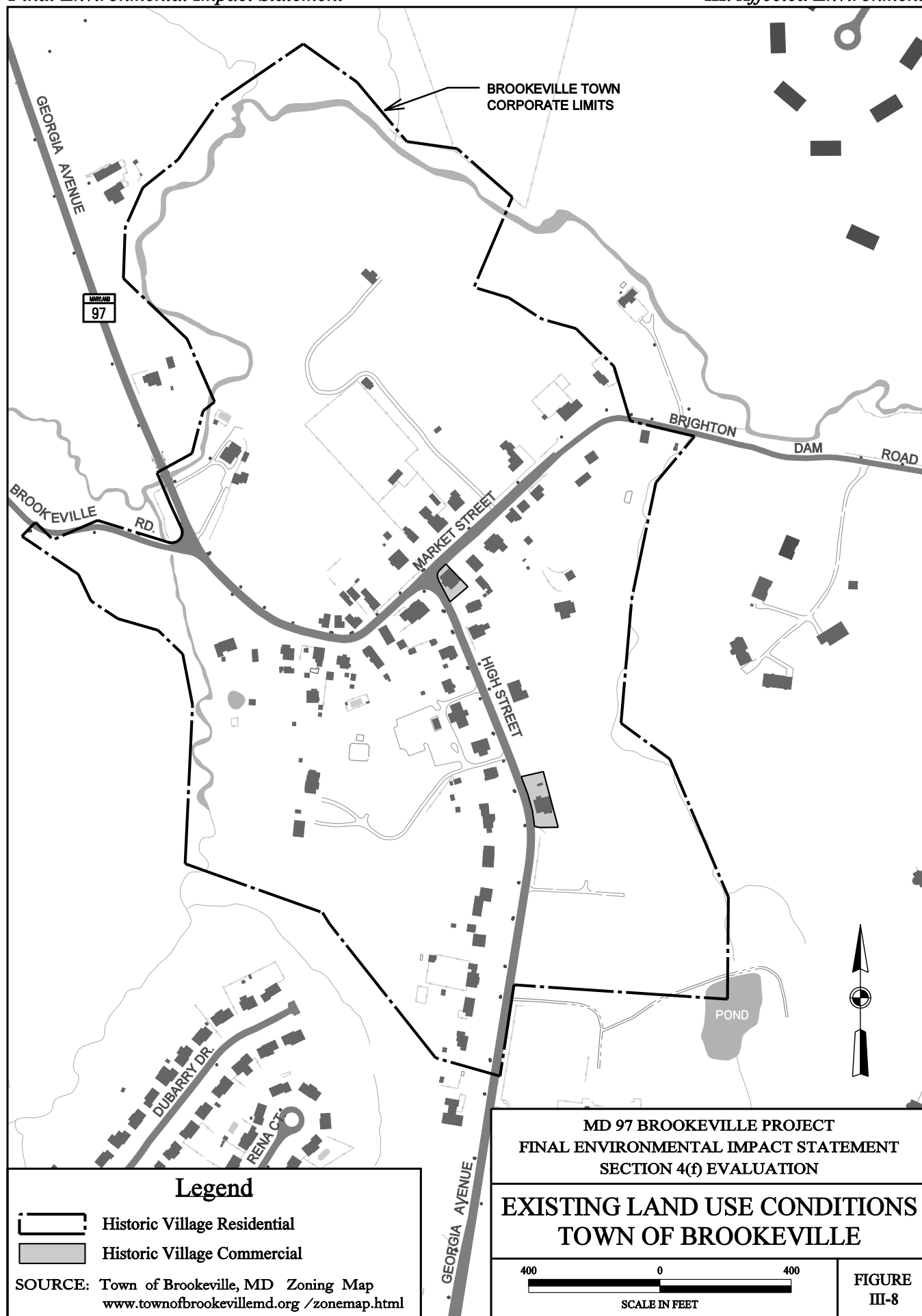
a. Existing

Land use within the project area includes a mixed use of residential, commercial, parkland, forest, croplands, and open grasslands (**Figure III-7**). Residential areas include the historic Town of Brookeville, the Holiday Drive subdivision and numerous individual homes throughout the project area. Commercial development in the project area consists of six small businesses located on Georgia Avenue, one located on Brighton Dam Road, and one located on Bordly Drive (**Figure III-6**). The Reddy Branch Stream Valley Park covers a significant percentage of the project area and is located along either side of Reddy Branch. The park is predominantly forested.

Within the Town of Brookeville, there are two land use categories: Historic Village Residential and Historic Village Commercial. There are two Historic Village Commercial properties in the Town of Brookeville, both of which are located along MD 97 (**Figure III-8**). Refer to **Section III.B** for further discussion of cultural resources.

The M-NCPPC has adopted a *Functional Master Plan for the Preservation of Agriculture and Rural Open Space* (M-NCPPC, 1980, updated 1988). The plan recommends techniques to protect and preserve farmland and rural open space. The project area is located within two agricultural protection areas of the county. The project area west of existing MD 97 is within the Rural





Density Transfer Zone or “RDT” zone (see **Figure III-3**). One dwelling unit is permitted per 25 acres of farmland. The project area east of existing MD 97 is located within the Rural Cluster Zone. In this zone, overall density is one dwelling unit per five acres and the tract is 100 acres in size. The number of permitted dwelling units is 20. The cluster option would allow these 20 units to be grouped on lots as small as two acres on approximately 40 percent of the parcel, or 40 acres.

b. Future

As shown in **Figure III-4**, the upper portion of Planning Area 23, designated Rural Density and Rural Cluster zoning, is predominately agricultural in nature. **Figure III-7** shows the existing land use conditions. Planned land use within the project limits is consistent with the existing land use conditions, in that growth is limited to areas adjoining ongoing development and not within the extensive Reddy Branch Stream Valley Park. Currently, two subdivisions are under construction. South of Sunnymeade, off of Brighton Dam Road, a small subdivision, consisting of four homes, is under construction. The other subdivision, consisting of three homes, is currently being constructed and is located off of Market Street. No other subdivisions have been proposed within the project area.

The Town of Brookeville (**Figure III-8**) has adopted the Brookeville Zoning Ordinance, which is designed to preserve and protect its historic heritage, and allow reasonable flexibility for new development, changes in existing structure, and current and future uses throughout the Town in a manner consistent with the goals and objectives of the Brookeville Comprehensive Plan, as amended.

Future land use in the State of Maryland is guided by the October 1997 “Smart Growth Neighborhood Conservation Initiatives.” The intent is to direct state funding for growth-related projects to areas designated by local jurisdictions as PFAs. PFAs are existing communities and other locally designated areas as determined by local jurisdictions in accordance with “smart growth” guidelines.

The Smart Growth Neighborhood Conservation Initiatives are intended to direct development to existing towns, neighborhoods, and business areas by directing state infrastructure improvements to those places. PFA boundaries were determined by Montgomery County on October 2, 1998. The municipal boundary of the Town of Brookeville is a PFA boundary (**Figure III-8**). The majority of the previously proposed MD 97 Brookeville Project’s bypass alternates, and three of the four Build Alternates retained for further study, were not within the PFA. As a result, the MD 97 Brookeville Project is subject to the following four conditions. The four criteria and the actions taken to meet those criteria are as follows:

- Under local ordinance, Montgomery County is to adopt, through appropriate enforceable action, restrictions that will prevent this bypass from allowing sprawl development. Any capacity a bypass might add to the network cannot be used to allow development outside the current boundaries of the Town of Brookeville.

Action: An amendment to the Annual Growth Policy was adopted on April 6, 1999 by the Montgomery County Council.

- A permanent easement held by a third party entity such as the MET must border the entire roadway to ensure that no future access, widening, or connection to the bypass is possible.

Action: The MET has tentatively agreed to hold the easement pending the development of the Letter of Commitment and the Memorandum of Understanding (MOU). An exact amount and location of this easement will be prepared during the design phase of this project. Meets and Bounds Plats will be prepared and will be part of the MOU. SHA submitted a Letter of Commitment to MET for signature on July 29, 2003 (**Section VI**).

- Montgomery County, the MDOT and Howard County governments must work out a safe “traffic calming” point north of the bypass to limit future traffic to the current capacity of MD 97 through Brookeville.

Action: A roundabout is proposed north of Brookeville Road to limit traffic capacity through the area. This roundabout will also serve as a safe traffic calming point.

- If for any reason these controls fail, Montgomery County will reimburse the state for the full cost of the bypass.

Action: This serves to further ensure that rural areas and open space are preserved, the environment is healthy, and thriving communities enjoy their quality of life.

4. Visual Quality

Viewsheds were determined by review of land use mapping and field reconnaissance throughout the project area to assist in the evaluation of the visual quality of the area. A viewshed is “the surface area visible from a given viewpoint or series of viewpoints; it is also the area from which that viewpoint or series of viewpoints may be seen” (FHWA, 1981). It may also be defined as, “a tool for identifying the views that a project could actually affect” (FHWA, 1981).

Existing Visual Environment

The existing project area is comprised of rural farmland in the northern portion, suburban residential developments in the southern portion, and the historic district in the central eastern portion of the project area. There is also forested land in the northern project area that is generally associated with Reddy Branch Stream Valley Park. Sensitive receptors in the project area considered for visual quality include the residential communities within the project area, Longwood Community Center, Reddy Branch Stream Valley Park (**Figure III-6** and **Figure III-7**), and the Bordley’s Choice historic site and the Brookeville Historic District (**Figure III-8**), as discussed in the next section.

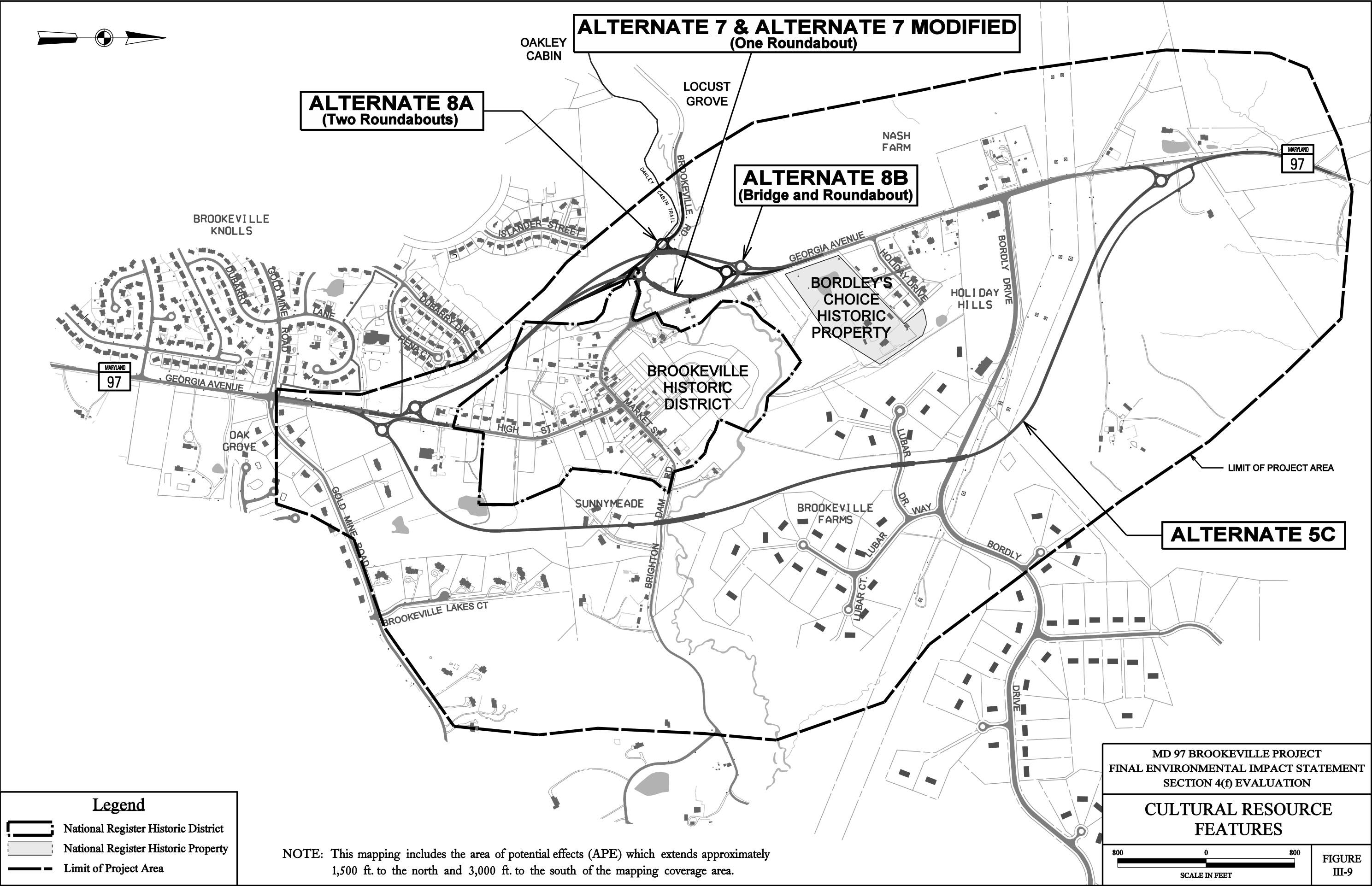
B. CULTURAL RESOURCES

Identification and evaluation of historic architectural and archeological resources were conducted in accordance with federal and state laws, which protect significant cultural resources. Federal and state mandates for cultural resources protection include: the U.S. Department of Transportation Act of 1966, as amended in 1968; the NEPA of 1969; the National Historic Preservation Act of 1966, as amended; 36 CFR Part 800 Protection of Historic Properties (Final Rule December 12, 2000); Executive Order 11593; the MHT Act of 1990 (Article 83B, Sections 5-619 of the Annotated Code of Maryland); and Article 83B, Sections 5-617 and 5-618 of the Annotated Code of Maryland.

Identification and evaluation of cultural resources were performed in accordance with the standards established in Standards and Guidelines for Architectural and Historical Investigations in Maryland (MHT, 2000); Standards and Guidelines for Archeological Investigations in Maryland (Shaffer and Cole, 1994); Collections and Conservation Standards (MHT, 1999); and Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines (NPS, 1983).

Background research and field surveys were conducted to facilitate identification of the cultural resources identified on **Figure III-9**. Review of previous planning and research studies, existing inventories of historic properties and previous survey information, and historic maps, was undertaken. The research was conducted in consideration of the magnitude and nature of the undertaking, degree of federal involvement, the nature and extent of potential effects on historic properties, and the likely nature and location of historic properties within the area of potential effects. Reports were prepared to facilitate evaluation of the cultural resources. These documents include: Determination of Eligibility Forms; *Phase IB Archeological Identification Survey for MD 97: Brookeville Study, Montgomery County, Maryland* (Goodwin, 1997); *Phase IB Archeological Identification Survey for Additional Alternates Proposed for MD 97: Brookeville Bypass, Montgomery County, Maryland* (Goodwin, 2000). Phase II archeological and historical investigations at Sites 18MO368 and 18MO460 for SHA project # MO746B11, MD 97 from Gold Mine Road to north of Holiday Drive, Montgomery County, Maryland (Goodwin, 2002).

All cultural resources identified during the architectural and archeological surveys were submitted to the SHPO for National Register eligibility determinations, or comment on the need for further evaluation. Historic properties were evaluated in accordance with criteria of the National Register of Historic Places. These criteria state that "the quality of significance in American History, architecture, archeology, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and: that are associated with events that have made a significant contribution to the broad patterns of our history (Criterion A); or that are associated with the lives of persons significant in our past (Criterion B); or that embody the distinctive characteristics of a type, period, or method of construction that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction (Criterion C); or that have yielded, or may be able to yield, information important in prehistory or history" (Criterion D) (36 CFR 60.4, and National Register Bulletin No. 15). Correspondence documenting prior consultation with the SHPO and other interested parties is provided in **Section VI**.



1. Historic Resources

The term “historic standing structures” refers to any above-ground building, structure, district, or object that attributes to our cultural past. When these resources meet the criteria for listing in the National Register of Historic Places, they are historic properties that must be considered under the requirements of the National Historic Preservation Act. Two historic sites are listed on or determined eligible for the NRHP and are located within the Area of Potential Effect (APE). The project’s APE and the locations of the sites (Brookeville Historic District (M23-65), and Bordley’s Choice (M23-66) are illustrated on **Figure III-9**. A description of each property and its significant characteristics are provided below.

The SHPO has concurred (April 16, 2001) that the two historic resources are within the APE and listed on or determined eligible for the National Register. The resources are discussed below:

a. Brookeville Historic District (M:23-65)

The Brookeville Historic District, a late 19th-century crossroads village, is significant for its architecture and its history as a commercial and service center for the surrounding agricultural area. The Town of Brookeville was originally settled by Richard Thomas in 1794 and was chartered by the legislature in 1808. Brookeville was incorporated in 1890 making it the oldest incorporated municipality in Montgomery County. It functioned as a center for education and commerce and was home to progressive agronomists including Thomas Moore who made several significant contributions to advance the farming industry, at first locally, then nationally. During the War of 1812, President James Madison fled Washington, D.C. during a short-lived British occupation of the capital and directed the federal government for two days from the home of Caleb Bently (now known as the Madison House – **Appendix G**), a farmer in Brookeville. Brookeville comprises an important collection of well-preserved buildings spanning the late 18th-20th centuries in a pristine setting. The Brookeville Academy (circa 1810) was one of the first private academies in Montgomery County (**Appendix G**). Homes reflecting both Federal style and Gothic Revival architecture (**Appendix G**) were common in the early and mid-1800s, respectively. The original road pattern of the historic village remains relatively unaltered, and is essential to its historic character.

In the early 20th century automobiles were introduced which changed the traffic patterns around Brookeville. More products were developed in factories rather than in small artisan’s shops. This changed the demographics and markets ending the commercial base of Brookeville. The town became a predominantly residential community.

In 1979, Brookeville was listed on the National Register as a historically significant 19th century rural settlement. In 1985, the Montgomery County Historic Preservation Ordinance was adopted. Subsequently, in 1986, the town was designated as a Master Plan Historic District to be protected under that Ordinance (Brookeville Planning Commission, 1994). Brookeville remains a small town consisting of approximately 52 buildings (Brookeville Planning Commission, 1994) and 120 residents (US Census Bureau, 2000).

The historic district boundary coincides with the boundary for the Town of Brookeville. The SHPO concurred with the Town’s eligibility and National Register boundaries (September 29, 1995).

Associated with the Town of Brookeville and within Reddy Branch Stream Valley Park, is the Oakley Cabin Trail (**Figure III-9**). The existing half-mile manmade trail partially connects the Town of Brookeville with the historic African American Oakley Cabin, which is located to the west of the project area. Oakley Cabin, which was originally built for slaves and later became the center of a small roadside Free Black community, is the only publicly owned African American historic site in Montgomery County that is open to the public. Historically, the Oakley Cabin Trail ran most of the way along an old mill race for Newlin's Mill in Brookeville. It was established and used by people who lived in the community and worked at Newlin's Mill, which is described below under archeological resources.

b. Bordley's Choice (M:23-66)

Bordley's Choice consists of a massive fieldstone dwelling structure and associated dependencies constructed between 1763 and 1869. In its early years, the plantation was associated with the prominent Riggs family of Montgomery County. In 1869, the original stone house was purchased and enlarged for use as the prestigious Brookeville Academy for boys and as Mrs. Porter's School for the Education of Young Ladies in 1869. In 1941, the property was restored for use as a private dwelling. In 1961, the house was purchased by an institution and the dining room converted to a chapel. The house reverted to private ownership in 1966 and is the home of the present owners.

The property's environmental setting is encompassed within 20.4 acres, which includes the main house, stable, and entrance to the main house. The house is a three bay by four bay house. It has a two-story porch with a flat roof supported by two Doric columns. Segmental and flat brick arches and sills adorn the window openings. The windows are six over nine paned windows with louvered shutters. Two dormer windows are on the north side of the house, four on the west and three on the east. Each dormer has a gabled roof. The roof is covered by slate tiles.

The property is significant for its association with the development of education in Montgomery County (Criterion A), and for its embodiment of distinctive characteristics associated with stone building construction (Criterion C). The SHPO has concurred with the eligibility and National Register boundaries for the resource (September 29, 1995; April 16, 1996).

2. Archeological Resources

The term "archeological resources" refers to all evidences of past human occupation that can be used to reconstruct the lifeways of past peoples. These include sites, artifacts, environmental and all other relevant information, as well as the contexts in which they occur. In accordance with the laws previously referenced, all archeological (prehistoric and historic) sites must be evaluated for their eligibility for the National Register by the SHPO.

The APE for archeological investigations was defined by the limits of proposed ROW and limits of ground disturbance associated with worst case impacts under all alternates retained for detailed study. Archeological identification investigations were conducted within the APE to ascertain the range and number of historic and prehistoric period archeological resources present, and to make recommendations for further evaluations for eligibility to the National Register.

Three archeological sites were determined to be potentially significant for information they may contain as documented in SHPO correspondence dated April 16, 2001 (**Section IV**). These resources are described below:

Site 18MO368 is the remains of the 18th-19th century Newlin/Downs Mill complex containing numerous features including a well, retaining wall, building foundations, mill wheel, and mill race. This National Register eligible site is considered an archeological resource and not a historic structure by the MHT because it consists of a collection of building ruins/foundations and below ground resources such as a well and a mill race. It is likely this site can contribute important information concerning the industrial economy and community planning in the Maryland Piedmont during a time period characterized by agrarian intensification and internal improvement (1780–1860).

Site 18MO387 is the remains of the Pleasant Hill Plantation and Cemetery, associated with the historically important Riggs Family from the mid-18th to early 20th centuries. Although the property encompassed a dwelling, associated outbuildings, and a cemetery, there are no extant historic standing structures associated with this site. However, the property does retain physical features of the setting including extant topography, road traces, and the spatial relationship between the structural ruins and the physical features of the site.

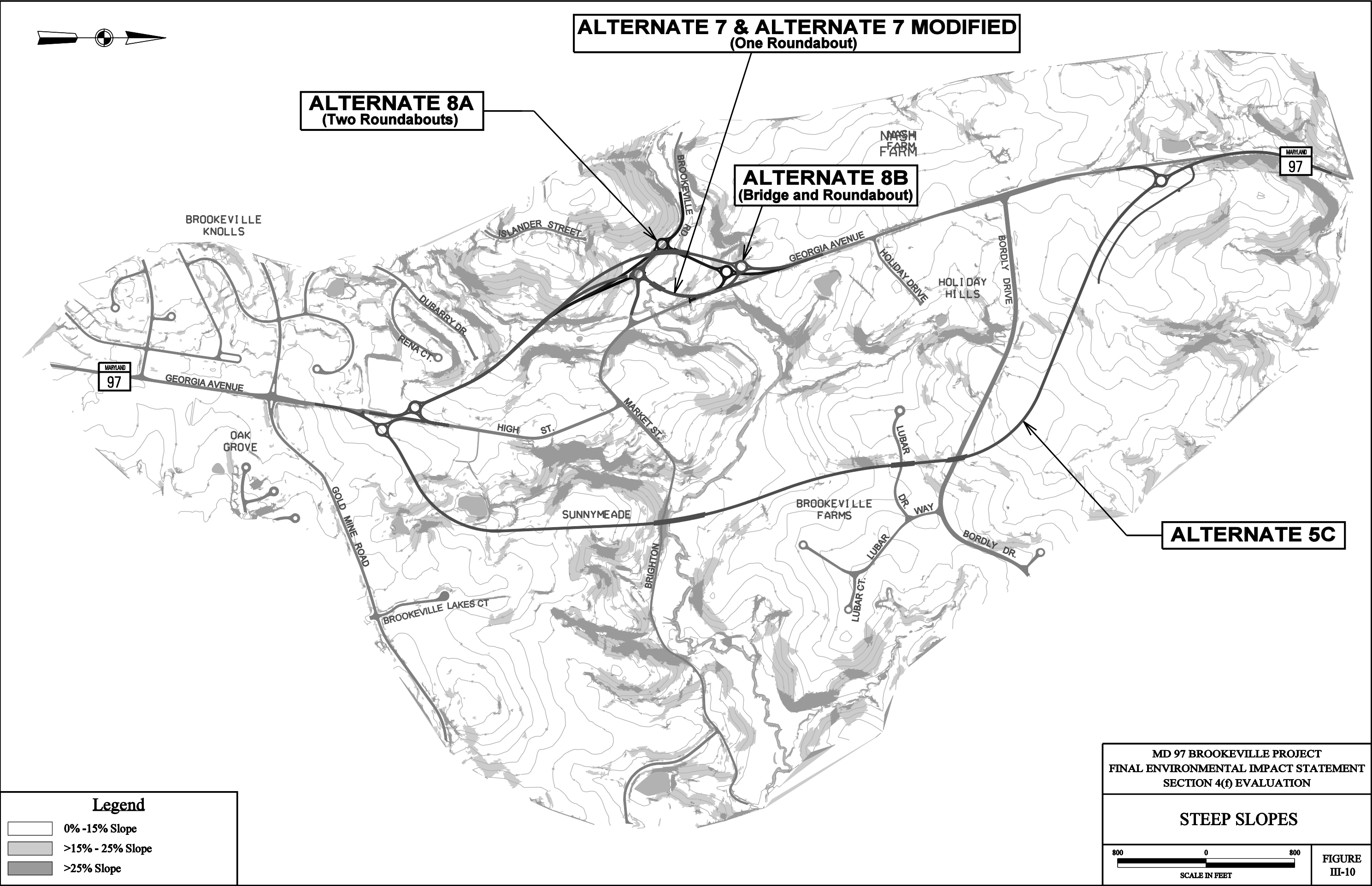
Site 18MO460 is the remains of a 19th and 20th century domestic occupation associated with the historic village of Brookeville. The observed horizontal and vertical patterning of artifacts and the potential for sub-surface features suggest that the site may have sufficient integrity to provide information regarding local agriculture and village development during the period of agrarian intensification and internal improvement (1780 – 1860).

C. TOPOGRAPHY, GEOLOGY, AND SOILS

1. Topography

The topography of the project area is slightly to moderately sloping, with elevations ranging from 326 to 514 feet above mean sea level. The average elevational gradient is approximately 11 feet per mile. Within the central portion of the project area, the lowest elevations occur along Reddy Branch. Lower elevations also occur in the extreme northern portion of the project area, along an unnamed tributary to the Hawlings River. Both of these larger stream systems have well-established, broad floodplains, while most of the other tributaries throughout the project area are generally found in well-confined valleys.

Slopes within the project area generally range from 0 to 15 percent but, steeper slopes, some greater than 25 percent, are common along the margins of the larger floodplains and in the confined valleys, which emanate from the higher elevations (**Figure III-10**).



2. Geology

The project area is located in the eastern portion of Montgomery County, within the eastern division of the Piedmont physiographic province. This area consists predominantly of metamorphic rocks of Paleozoic age. The project area consists of boulder gneiss and norbeck quartz diorite of the Wissahickon Formation. Boulder gneiss, the dominant rock type, is characterized by thick bedded to massive pebble-and boulder-bearing, arenaceous to elitic metamorphic rock and is typically a medium-grained, garnetoligoslase-mick-quartz gneiss. Norbeck quartz diorite ranges from weakly foliated quartz diorite to strongly gneissic and schistose rock with recrystallized textures (Maryland Geological Survey, 1968).

3. Soils

Information on Montgomery County soil series, Prime Farmland Soils, Soils of Statewide Importance, and Locally Important and Unique Soils was obtained from consultation with the Montgomery Soil Conservation District and review of the *Soil Survey of Montgomery County, Maryland* (United States Department of Agriculture (USDA), 1995).

Figure III-11 on page III-31 shows the soils mapped within the project area. According to the *Montgomery County, Maryland Soil Survey Interim Report* (USDA, 1990), there are 17 soil mapping units within the project area. **Table III-6** on page III-30 lists these soil mapping units, and identifies potential erosion hazard, depth to seasonal highwater table, drainage class, and other characteristics that could potentially affect highway construction. The ten soil series within the project area are briefly described below:

Baile Series (6A) - Very deep and poorly drained; formed in alluvium and in the underlying material weathered mainly from mica schist and gneiss; generally in upland depressions and along drainageways.

Blocktown Series (116D, 116E) - Shallow and well-drained; formed in material weathered from phyllite and schist; generally found on Piedmont Plateau.

Brinklow Series (16B, 16C, 16D) - Moderately deep and well-drained; formed in material weathered from acid crystalline rocks; generally found on broad ridgetops and side slopes in the uplands on the Piedmont Plateau.

Codorus Series (53 Option A) - Very deep and moderately well-drained or somewhat poorly drained; formed in recently deposited alluvium derived mainly from metamorphic and crystalline rocks; found on smooth floodplains.

Gaila Series (1B, 1C) - Very deep and well-drained; formed in material weathered from quartz muscovite schist; generally found on uplands.

Glenelg Series (2B, 2C) - Very deep and well-drained; formed in material weathered from schist and gneiss; generally found on uplands.

Glenville Series (5A, 5B) - Very deep, moderately well drained or somewhat poorly drained, with a slowly permeable layer; formed in residuum and colluvium derived from schist, gneiss, and other crystalline rocks; found along drainageways and in low areas on uplands.

Hatboro Series (54A) - Very deep and poorly drained; formed in alluvium derived from metamorphic and crystalline rocks; generally found on floodplains.

Occoquan Series (17B, 17C) - Deep and well drained; formed in material weathered from gneiss and schist; generally found on broad ridgetops and side slopes in the uplands.

Wheaton Series (66UB) - Very deep and well-drained; formed in material weathered from schist and gneiss; found in areas that have been altered by heavy equipment.

D. CLIMATE

Climatological data were obtained from the *Soil Survey of Montgomery County, Maryland* (USDA, 1995), as presented in **Table III-7**.

Table III-7 Climatic Characteristics of Montgomery County, Maryland

Month	Average Daily Temperature	Average Daily Maximum	Average Daily Minimum	Average Precipitation	Average Snowfall
	Degrees Fahrenheit			Inches	
January	33.2	42.6	23.8	2.81	5.2
February	35.4	45.9	24.8	2.65	3.9
March	44.2	55.8	32.6	3.53	3.6
April	54.8	67.7	41.9	3.19	0.1
May	63.9	76.5	51.3	3.79	0.0
June	71.5	83.6	59.4	3.92	0.0
July	75.7	87.4	64.0	3.77	0.0
August	74.2	85.7	62.6	4.34	0.0
September	67.8	79.7	55.8	3.12	0.0
October	57.1	69.3	44.8	2.91	0.0
November	46.4	57.1	35.7	2.96	1.0
December	36.8	46.4	27.2	2.89	3.5

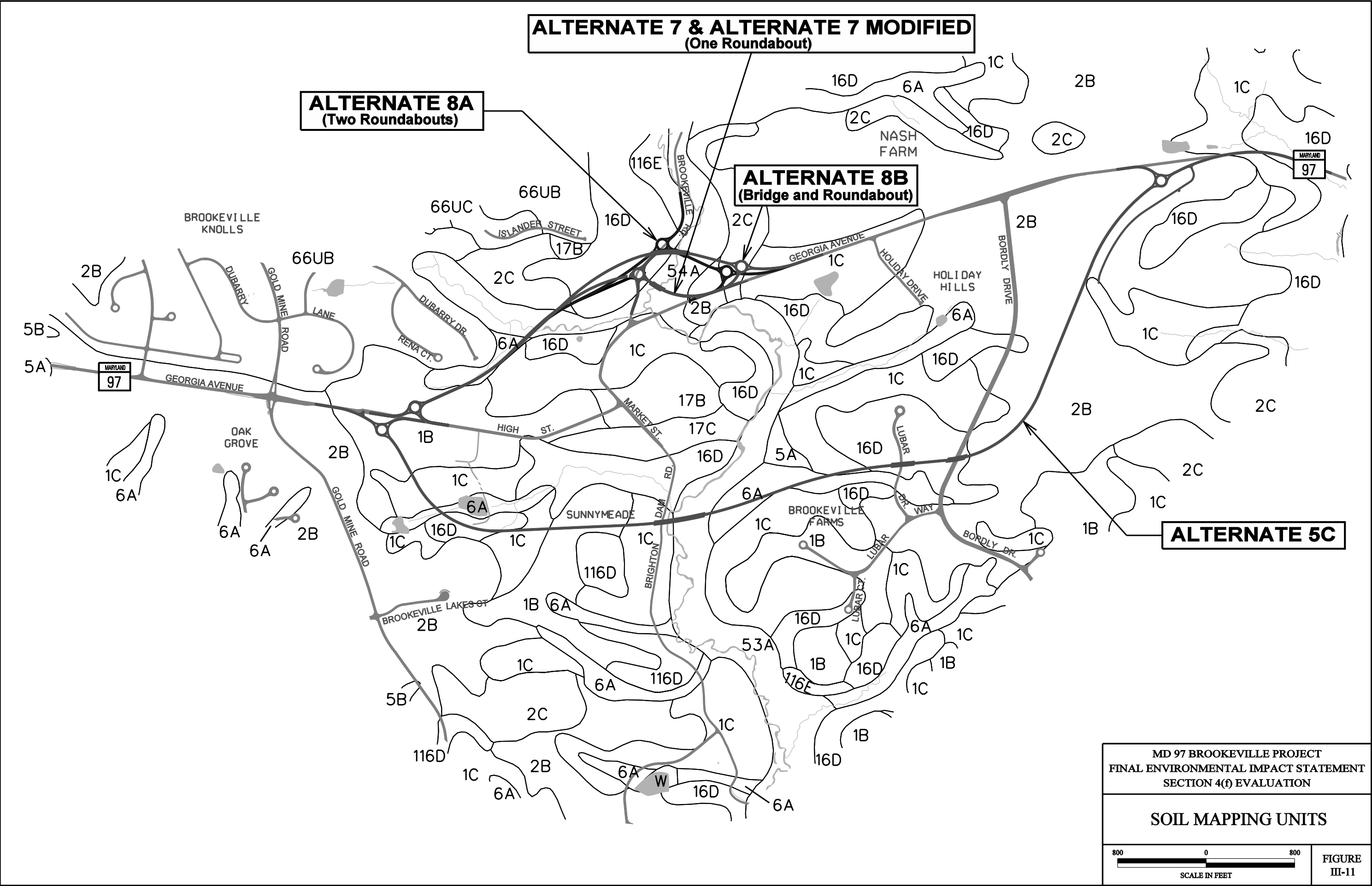
Source: USDA, Natural Resources Conservation Service, 1995.

The study area experiences hot summers and mild winters, with precipitation fairly frequent throughout the year. The summer months usually experience more precipitation than the other months of the year, with thunderstorms being the primary source of precipitation (Carpenter, 1983). The total annual precipitation is about 40 inches. Approximately 55 percent of the annual precipitation occurs between April and September. The growing season for most crops falls within this period. The average relative humidity in mid-afternoon is approximately 55 percent. Average and maximum summer temperatures are 74 degrees Fahrenheit [F] and 86 degrees F, respectively. Average and minimum winter temperatures are 35 degrees F and 25 degrees F, respectively. The prevailing wind is from the west-northwest. The average wind speed is highest, 11 miles per hour, in the spring. (USDA, 1995).

TABLE III-6 Characteristics of Soils Within the Study Area

Map Symbol	Soil Mapping Unit	Erosion Potential	Depth to High Water Table m(ft)	Drainage Class	Potential Frost Action	Restrictive Soil Features Affecting Highway Construction
6A	Baile silt loam, 0-3% slopes	Slight	0-0.15 (0-0.5)	very deep and poorly drained	High	Severe: wetness, frost action
116D	Blocktown channery silt loam, 15-25% slopes, very rocky	Moderate	>1.8 (>6.0)	shallow and well drained	Moderate	Severe: slopes
116E	Blocktown channery silt loam, 25-45% slopes, very rocky	Severe	>1.8 (>6.0)	shallow and well drained	Moderate	Severe: slopes
16B**	Brinklow-Blocktown complex, 3-8% slopes	Slight	>1.8 (>6.0)	well drained, gently sloping	Moderate	Moderate: depth to rock, shrink-swell
16C**	Brinklow-Blocktown channery silt loams, 8-15% slopes	Slight	>1.8 (>6.0)	well drained, moderately steep	Moderate	Moderate: depth to rock, shrink-swell, slope, frost action
16D	Brinklow-Blocktown channery silt loams, 15-25% slopes	Moderate	>1.8 (>6.0)	well drained, moderately steep	Moderate	Severe: Slope
53A	Codorus silt loam, 0-3% slopes, occasionally flooded	Slight	>0.3-0.6 (1.0-2.0)	very deep, moderately well drained or somewhat poorly drained	High	Severe: flooding, frost action
1B*	Gailla silt loam, 3-8% slopes	Slight	>1.8 (>6.0)	very deep and well drained	Moderate	Moderate: frost action
1C**	Gailla silt loam, 8-15% slopes	Moderate	>1.8 (>6.0)	very deep and well drained	Moderate	Moderate: slope, frost action
2B*	Glenelg silt loam, 3-8% slopes	Slight	>1.8 (>6.0)	very deep and well drained	Moderate	Moderate: frost action
2C**	Glenelg silt loam, 8-15% slopes	Slight	>1.8 (>6.0)	very deep and well drained	Moderate	Moderate: slope, frost action
5A	Glenville silt loam, 0-3% slopes	Slight	0.15-0.9 (0.5-3.0)	very deep and moderately well drained or somewhat poorly drained	High	Severe: wetness, frost action
5B	Glenville silt loam, 3-8% slopes	Slight	0.15-0.9 (0.5-3.0)	very deep and moderately well drained or somewhat poorly drained	High	Severe: wetness, frost action
54A	Hatboro silt loam, 0-3% slopes, frequently flooded	Slight	0-0.15 (0-0.5)	very deep and poorly drained	High	Severe: flooding, wetness, frost action
17B*	Occoquan loam, 3-8% slopes	Slight	>1.8 (>6.0)	deep and well drained	Moderate	Moderate: frost action
17C**	Occoquan loam, 8-15% slopes	Slight	>1.8 (>6.0)	deep and well drained	Moderate	Moderate: slope, frost action
66UB	Wheaton-Urban land complex, 0-8% slopes	Slight	---	very deep and well drained soils intermixed with urban land	Moderate	Moderate: frost action

Note: * denotes Prime Farmland Soils; ** denotes Soils of Statewide Importance



E. FARMLANDS

Farmlands are primarily limited to the northern portion of the project area, north and west of Holiday Drive. Typical crops include hay, corn, soybean, and other agricultural crops. The cropland west of MD 97 is part of larger farm that extends beyond the project area. The farmland east of MD 97 within the project area is currently surrounded by parkland to the north and east, and grassland to the south.

The Montgomery Soil Conservation District was consulted to determine which soils within the project area are classified as Prime Farmland Soils, Unique Farmland Soils, Soils of Statewide Importance, or Locally Important Soils.

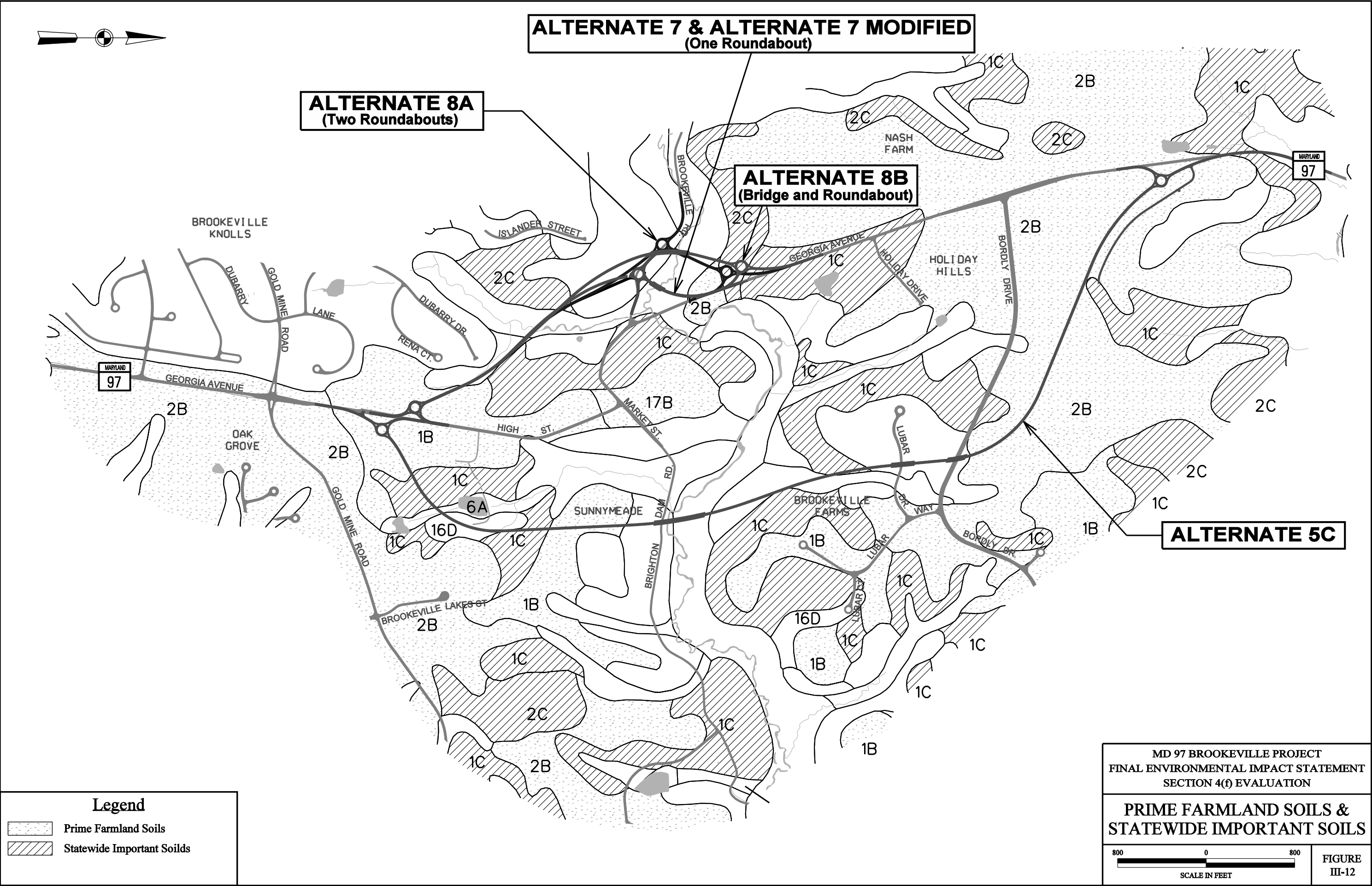
Prime Farmland Soils and Soils of Statewide Importance located within the project area are shown on **Figure III-12**. Approximately 60 percent of the project area consists of Prime Farmland Soils or Soils of Statewide Importance. There are no Unique or Locally Important Soils in Montgomery County.

Prime Farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is also available for these uses (the land could be cropland, pasture land, forest land, or other land, but not urban built-up or water). It has the soil quality, growing season and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods. Prime Farmland Soils generally have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, an acceptable acidity or alkalinity, an acceptable salt content, and few or no rocks. They are permeable to water and air. Prime Farmland Soils are not excessively erodible or saturated with water for a long period of time and they either do not flood frequently or are protected from flooding. The Prime Farmland Soils within the project area include:

- 1B - Gaila silt loam, 3 to 8 percent slopes
- 2B - Glenelg silt loam, 3 to 8 percent slopes
- 17B - Occoquan loam, 3 to 8 percent slopes

Soils of Statewide Importance are for the production of food, feed, fiber, forage, and oilseed crops. Criteria for defining and delineating this land are determined by appropriate state agencies. Additional farmlands of statewide importance include those that are nearly Prime Farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. The Soils of Statewide Importance within the project area include:

- 1C - Gaila silt loam, 8 to 15 percent slopes
- 2C - Glenelg silt loam, 8 to 15 percent slopes
- 16B - Brinklow-Blocktown complex, 3 to 8 percent slopes
- 16C - Brinklow-Blocktown complex, 8 to 15 percent slopes
- 17C - Occoquan loam, 8 to 15 percent slopes



F. GROUNDWATER RESOURCES

A review of the WSSC records was conducted to determine if the project area was served by public water and sewer. This review showed that WSSC provides public sewer and water service for approximately two-thirds of the project area, especially to the west of MD 97 and south of Brighton Dam Road. The remaining one-third of the project area is served by private wells for water and septic systems for sewage disposal.

According to the MDE, Water Rights Division, the only aquifer in the area is the Lower Pelitic Schist of the Wissahickon Formation, which is located just east of the project area where the Tridelphia Reservoir is located (Gapinko, 1997). The USEPA has identified the project area to be within a drinking water area designated as a sole source aquifer. A sole source aquifer supplies 50 percent or more of the drinking water for a given area.

The MDE, Water/Wastewater Permits Division was also contacted to determine the occurrence of wells within the project area (Smith, 2001). The well records obtained from this division confirmed that slightly over one-third of the project area is served by private wells. The dominant water use from extraction of the wells is for domestic use. A small number of wells within or nearby the project area extract water for farming, or test, observation, and monitoring purposes. Groundwater quality data was not requested from Montgomery County Department of Permitting Services; however, a response from this department revealed no groundwater monitoring information (Stephens, 2001).

G. SURFACE WATER RESOURCES**1. Physiography, Drainage, and Geology**

The physiography and geology within the study area was discussed previously in **Section III-C.2**. The entire project area is drained by tributaries to the Patuxent River.

2. Hydrology

The main riverine system within the defined project area is Reddy Branch and its associated tributaries, including Meadow Branch. In addition to Reddy Branch, an unnamed tributary to the Hawlings River is located on the extreme northern project area boundary. Reddy Branch is a large tributary of the Hawlings River, and flows in an eastern direction through the south-central portion of the project area. Reddy Branch receives drainage from approximately 75 percent of the project area, or 660 acres within the project area. Due to the dominant drainage area of Reddy Branch within the project area and because all alternates require crossing this system, this stream was field investigated for the purposes of stream characterization. The confluence of Reddy Branch and the Hawlings River is located outside (downstream) of the project area. Both Reddy Branch and Hawlings River are within the Rocky Gorge subwatershed, which is part of the Patuxent River watershed.

Reddy Branch generally has a well-established, broad floodplain, while most of its tributaries are in well-confined valleys of the project area. The stream channel is well-defined throughout the project area with an average bank height of approximately four to seven feet and an average streambank width between 25 and 30 feet. The substrate in the mainstem of Reddy Branch primarily consists of gravels and cobbles intermixed with fines. The tributaries are generally dominated by larger gravel and cobble material. Stream flow gaging data was obtained from the United States Geological Survey (USGS, Water-Data Report MD-DE-95-01) (**Appendix B**). The closest gaging station is located southeast (downstream) of the project area, along Hawlings River.

Per the United States Coast Guard publication “Bridges over the Navigable Waters of the United States Atlantic Coast (COMATPUB P16590.1), Hawlings River and Reddy Branch are not listed as navigable waters. A letter was sent to the United States Department of the Interior, NPS requesting a listing of any nearby streams on the Federal Inventory of Scenic and Wild Rivers. A response was not received. The DNR has designated the Patuxent River as a State Scenic and Wild River. The project area does not include any portions of the mainstem of Patuxent River. However, the stream systems throughout the project area are located within the Patuxent River watershed and are therefore still subject to review by DNR relevant to Scenic and Wild River Program.

3. Channel Classification

To aid in the characterization of the stream systems within the project area, a preliminary classification effort was conducted using *A Classification of Natural Rivers* (D. Rosgen, 1996). Rosgen’s classification system categorizes stream channels with like attributes using an alphanumeric system. In general, Rosgen’s stream types follow a continuum based on slope, with “A” channels typical of high gradient mountain streams; “C” channels representing low gradient floodplain regions; and “B” channels as intermediates between “A” and “C”. Other types described by Rosgen include: braided, “D” channels; highly sinuous and narrow “E” channels typical of marsh or meadow landscapes; and “F” and “G” channels with natural or induced entrenched conditions. Channels are further described using a numeric system 1 through 6, based on site-specific conditions such as bed material, slope and planform (i.e., horizontal dimensions and pattern of a stream, such as width and sinuosity) characteristics. The system has utility as a communications tool to aid in the visualization of the broad channel types. Rosgen’s system has also been used as a guide for land management practices and channel restoration activities including transportation planning efforts that involve stream crossings.

To develop a preliminary classification for the channels within the project area, representative cross-sections were taken along Reddy Branch and supporting tributaries. Cross-section locations were preliminarily established on photogrammetric mapping (two-foot contour intervals) along reaches of similar slope and valley configurations and further refined in the field. Seven sections were established within the project area (**Figure III-13**). **Appendix B** contains data collected at each of the seven sections, including the offset location and rod depth used to determine the relative elevation along the stream cross-section. The elevations were then plotted to develop a graphical representation of each stream cross-section. **Table III-8** summarizes the channel classification results.

TABLE III-8 Stream Classification Parameters

Section	Slope (m/m) (a)	Width (m)	Width/Depth Ratio (b)	Entrenchment (c)	Substrate	Sinuosity (a)	Rosgen Stream Class.
1	0.01	9.54	13.83	1.35	Gravel	1.28	F4
2	0.025	9.39	22.4	1.28	Cobble	1.28	B3
3	0.04	4.07	8.23	1.53	Gravel	1.1	A4
4	0.004	7.33	6.01*	2.35	Gravel	1.46	C4
5	0.04	4.31	13.51	1.25	Cobble	1.1	B3
6	0.009	8.32	17.14	1.16	Gravel	1.28	F4
7	0.0067	8.01	10.13*	1.19	Gravel	1.28	F4

*Values fall outside the range for width/depth ratio under Rosgen's classification system.

(a) Slope and sinuosity were determined from calculations based on 2 ft contour interval photogrammetric mapping.

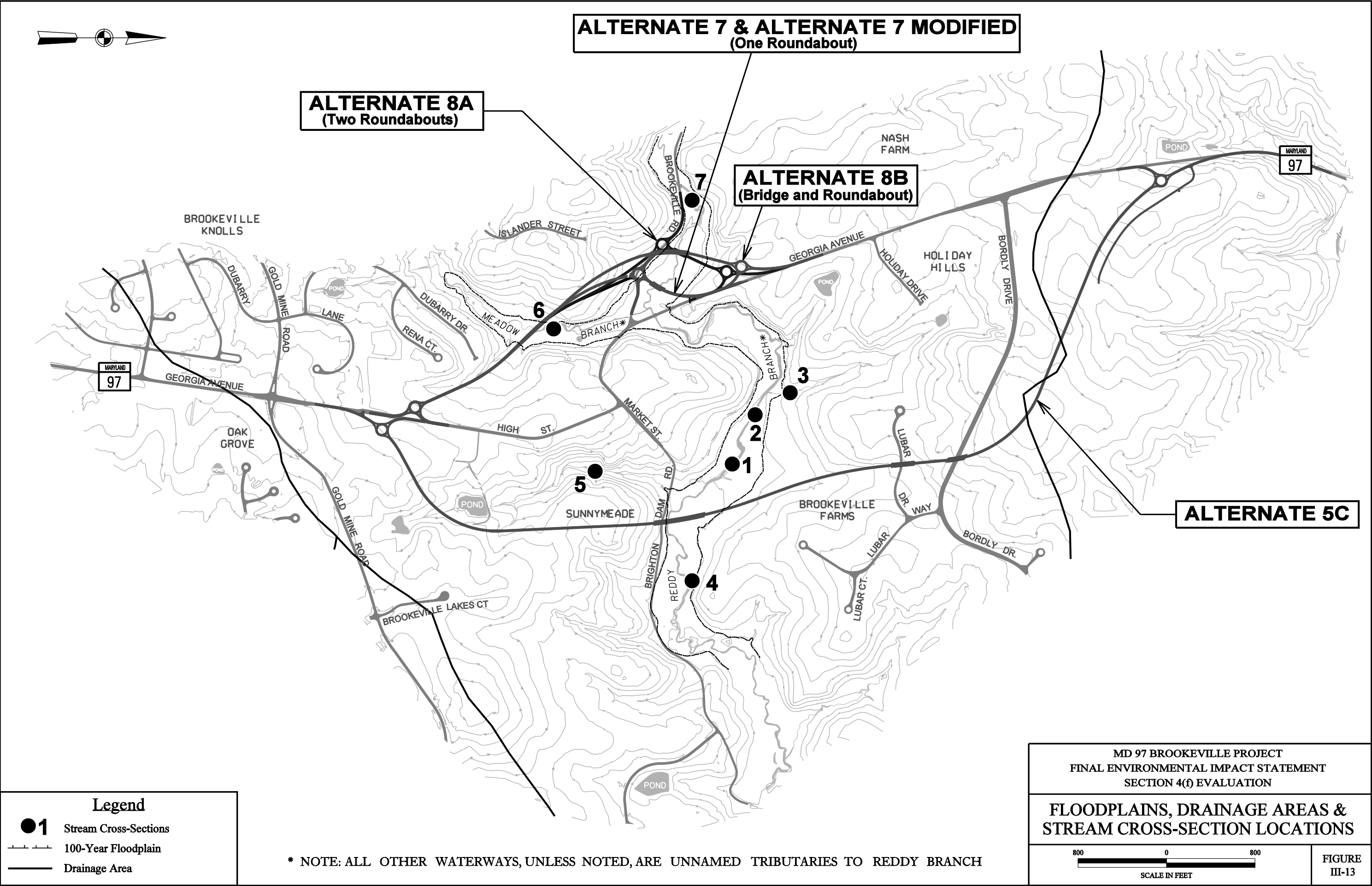
(b) Width/Depth is bankfull width divided by average bankfull depth.

(c) Entrenchment is floodprone width divided by bankfull width.

With the exception of the channel reach at Section 2, Reddy Branch was characterized primarily as an "F-4" channel type. Rosgen's general description of an "F" channel is a meandering, riffle/pool channel on low gradients and a high width/depth ratio. These meandering channel types are generally entrenched in highly weathered material, and are laterally unstable with high bank erosion rates. The sub-classification of "4" indicates that the channel material of Reddy Branch consists primarily of gravel.

Along many portions of Reddy Branch, the channel was characterized by high five to seven foot banks appearing to inhibit floodplain access. Under Rosgen's system, the entrenched condition means that at two times the maximum bankfull depth, a floodprone area (assumed as the 50-year storm elevation by Rosgen) is not accessible. This usually is a result of either channel degradation (bed lowering) and/or filling (encroachment along the floodplain). This condition exacerbates channel bed and bank erosion and can result in significant removal and transport of sediments. A number of reaches along Reddy Branch are currently exhibiting bank and bed erosion problems. It should be noted, however, that without verification of the bankfull flow condition (from detailed field investigations) and flood elevation frequencies, the degree of entrenchment is an estimate, at best. It is possible that the channel floods frequently enough (as informed by local residents) that bank stress is of a shorter duration and entrenchment values obtained here are solely artifacts of Rosgen's system. It is obvious from field investigations, however, that numerous reaches are exhibiting bank erosion problems typical of "F" channel types.

The reach at Section 2 was classified as a "B-3" channel type. Rosgen's general description of a "B" channel is a moderately entrenched, riffle-dominated channel, with infrequently spaced pools, stable banks, and moderate gradients. Colluvial deposition and/or residual soils are associated with this channel type, and are generally found in narrow, gently sloping valleys. This reach of approximately 400 feet was the only "B" type channel found along the mainstem of Reddy Branch in the project area. Many of the tributaries draining to Reddy Branch are stable "A" and "B" type channels. Rosgen describes "A" channel types as steep, entrenched, cascading, step/pool streams. These channels exhibit high energy/debris transport associated with depositional soils. The "A" and "B" channel types are typical of high to moderate relief areas. These tributaries have well-vegetated riparian zones and minimal bed and bank erosion.



Meadow Branch, a tributary to Reddy Branch (located west of MD 97 and just south of Brookeville Road) does not exhibit the characteristics typical of most of the tributaries within the project area. The lower section of this tributary (Section 6) appears to be somewhat confined (probably by bed lowering and floodplain encroachment); however, the surrounding riparian zones and contributing watershed are well-vegetated (**Figure III-13**).

In general, Rosgen’s classification system indicates stable tributary streams and a mainstem (Reddy Branch) that appears to be actively adjusting itself causing entrenched conditions and localized bed and bank erosion problems.

4. Water Quality

The streams within the project area are designated by MDE as “Use IV-P - Recreational Trout Waters and Public Water Supply”. Use IV-P waters include cold or warm waters which have the potential for or are capable of holding or supporting adult trout for put-and-take fishing, managed as a special fishery by periodic stocking and seasonal catching, and use as a public water supply. Water quality criteria specified for Use IV-P waters are as follows:

<i>Bacteriological</i>	There may not be any sources of pathogenic or harmful organisms in sufficient quantities to constitute a public health hazard (as defined in COMAR 26.08.02.03-3).
<i>Dissolved Oxygen (DO)</i>	5 mg/l
<i>Temperature</i>	23.8° C (75° F) (maximum) or the ambient temperature of the surface waters, whichever is greater.
<i>pH</i>	6.5 - 8.5
<i>Turbidity</i>	Maximum of 150 units at any given time or 50 units as a monthly average (Nephelometer Turbidity Units).
<i>Toxic Substance Criteria</i>	All toxic substance criteria to protect fresh water aquatic organisms and public water supplies and the wholesomeness of fish for human consumption.

Water quality data was requested from the USEPA Storage and Retrieval (STORET) system. The STORET system is a database of sampling sites and their associated water quality data. The data and information requested by USEPA’s database was only for specific sampling sites within or nearby the defined project area. The results of the database retrieval revealed no sampling sites immediately within the project area; however, one sampling site was identified along Reddy Branch, downstream of the project area. The period of record for various water quality parameter measurements from this station is from 1971 to 1984. A summary table of water quality parameter measurements at this station is included in **Appendix C**. The STORET information shows that, in general, water criteria for Use IV-P streams have been met. However, more recent data (1984 to present) was not available.

H. FLOODPLAINS

The 100-year floodplain limits have been identified and delineated based on mapping provided by the Federal Emergency Management Agency (FEMA). The entire project area lies within the Patuxent River Basin. FEMA-designated 100-year floodplains within the study area are associated with Reddy Branch and Meadow Branch. Floodplain boundaries for Reddy Branch and Meadow Branch are shown on **Figure III-13**.

The 100-year floodplain associated with the mainstem of Reddy Branch is generally wooded consisting of numerous Reddy Branch wetlands. A large fallow field is also situated on this floodplain along Brighton Dam Road, portions of which are emergent wetland.

The floodplain associated with Meadow Branch is mostly forested. One palustrine emergent/scrub-shrub wetland was identified east of the tributary. One portion of this floodplain consists of a maintained residential lawn, is located just south of Brookeville Road and west of existing MD 97.

I. WETLANDS

Proposed development activities within waters of the United States (WUS), including jurisdictional wetlands, are subject to review, approval, and comment by various federal and state agencies in accordance with Section 404 of the US Clean Water Act. These agencies include, but are not limited to, the USACOE, MDE, the USFWS, and the DNR. The federal/state wetland and waterway permit process in Maryland is a combination of different permit authorization categories, and depending upon the type and category of the proposed activity, may include and necessitate review by different federal and/or state agencies. In Maryland, the permit process is a joint process between the USACOE and MDE, and is identified as the Maryland State Programmatic General Permit (MSPGP).

State wetland and waterway permits are typically included in the MSPGP authorization. A MDE Water Quality Certification (WQC), governed under Section 401 of the US Clean Water Act, may be required, particularly if a Section 404 permit is necessary. MDE permits, for non-tidal or tidal wetland impacts and/or waterway construction activities, may be required depending upon the extent of impacts, either independently or as part of the overall MSPGP process.

Wetlands within the project area were identified and field delineated in October 1995 following methods contained in the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory, 1987). A detailed *Wetland Identification and Delineation Report* was prepared in November 1995, detailing the findings of the wetland delineation. A Jurisdictional Determination of the wetland boundaries was conducted on December 5, 1995, with agency representatives from the USACOE and the USFWS present at the review. Minor modifications to the original *Wetland Identification and Delineation Report* (November, 1995) resulted from the jurisdictional determination, and these modifications are documented in Maryland State Highway Administration (SHA) field meeting minutes and the *Wetland Identification and Delineation Report Addendum* (December, 1995). The Jurisdictional Determination for the project was to expire on December 5, 2000. Based on an October 2000 meeting with regulatory agency personnel including the USACOE, the permit was extended by two years and was set to expire on December 5, 2002. Based on conversations with the USACOE (Paul Wettlaufer) in February 2003, the Jurisdictional Determination, for the purposes of the FEIS, will remain valid.

The wetland identification/delineation and the jurisdictional field review determined a total of 20 nontidal wetland areas, two large unvegetated WUS systems, and several open water ponds within the project area (**Figure III-14**). Of the 20 identified wetlands in the project area, two include unvegetated WUS systems. The two large unvegetated WUS systems include: Reddy Branch (part of Wetland 1), the unnamed tributary to the Hawlings River (part of Wetland 2), and any tributaries associated with either of these two larger systems. Most of the identified vegetated wetland areas are associated with an adjacent riverine system. The functions and values for each wetland were evaluated following *The Highway Methodology Workbook Supplement: Wetland Functions and Values, A Descriptive Approach* (USACOE, New England Division, 1993), and these data sheets are included in **Appendix D**. This methodology of wetland function-value evaluation rates the following functions/values: groundwater recharge/discharge; floodflow alteration; fish and shellfish habitat; sediment/toxicant/pathogen retention; nutrient removal/ retention/ transformation; production export; sediment/shoreline stabilization; wildlife habitat; recreation; educational/scientific value, uniqueness/heritage; visual quality/aesthetics; and threatened or endangered species habitat.

Identified vegetated wetlands within the MD 97 Brookeville Project area can be broken down into three primary classifications including palustrine forested, palustrine scrub-shrub, and palustrine emergent. Some of the identified wetlands consist of more than one vegetation classification. Descriptions of these wetlands are given below. **Table III-9** contains a summary of relevant information about each wetland including classification(s), size, and principle functions.

Wetland 1 - Riverine (Waters of the United States)

Wetland 1 is predominantly a riverine system WUS that is located in the central portion of the project area (Reddy Branch). Reddy Branch, which flows from west to east through the central portion of the project area, is a major tributary to Hawlings River, and this system also includes Meadow Branch and other unnamed tributaries that discharge to Reddy Branch. The Cowardin classification associated with this system is a riverine, upper perennial system with unconsolidated cobble/gravel bottom (R3UB1). Most of the tributaries that drain into Reddy Branch also have this classification; however, some are classified as riverine, intermittent streams (R4UB1). Although Wetland 1 is predominantly a riverine system, several vegetated wetlands are associated with this system (hydrologically connected). Descriptions of vegetative wetlands associated with Wetland 1 are provided below. According to the *Montgomery County, Maryland Soil Survey Interim Report* (USDA, 1990), Codorus silt loam (53A) soils dominate the underlying portions of Reddy Branch. This soil type is described as being very deep and moderately well to somewhat poorly drained.

Wetland 2 - Riverine (Waters of the United States)

Wetland 2 is a riverine system WUS associated with the unnamed tributary to the Hawlings River, and is located in the extreme northern portion of the project area, to the east and west of MD 97. The majority of the unnamed tributary falls just outside the project area limits; however, the floodplain and a small portion of this large tributary bisect the northernmost portion of the project area (on the east side of MD 97). In addition, three other tributaries that discharge to the unnamed tributary from the south are located within the limits of the project area (to the east and west of MD 97). The dominant Cowardin classification associated with this system is a riverine, upper perennial system with unconsolidated cobble/gravel bottom (R3UB1). Although Wetland 2 is predominantly a riverine system, several vegetated wetlands are associated with this system.

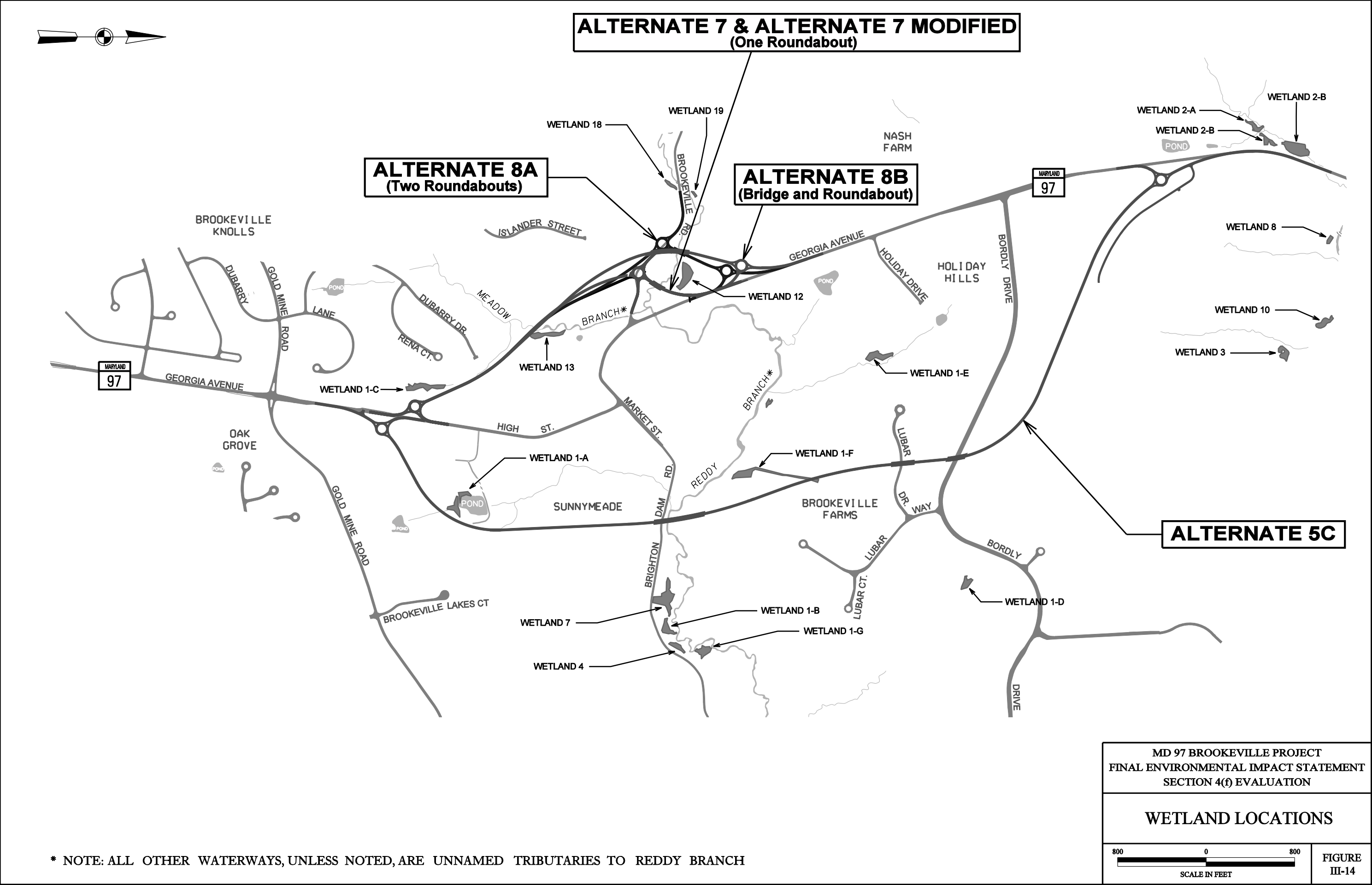


TABLE III-9 Wetland Characteristics

Wetland Number	Cowardin Classification	Wetland Size (acres)	Principal Functions
1	WUS	---	---
1-A	PEM/PSS	0.27	Groundwater Recharge/Discharge Floodflow Alteration Sediment/Toxicant Retention Nutrient Removal Visual Quality/Aesthetics
1-B	PEM	0.17	Groundwater Recharge/Discharge Floodflow Alteration Sediment/Toxicant/Pathogen Retention Production Export Sediment/Shoreline Stabilization Wildlife Habitat
1-C	PFO	0.32	Groundwater Recharge/Discharge Floodflow Alteration Sediment/Toxicant/Pathogen Retention Nutrient Removal Production Export
1-D	PFO	0.14	Groundwater Recharge/Discharge Floodflow Alteration Sediment/Toxicant/Pathogen Retention Nutrient Removal Production Export Sediment/Shoreline Stabilization Wildlife Habitat Visual Quality/Aesthetics
1-E	PEM/PFO	0.27	Nutrient Removal
1-F	PFO	2.30	Groundwater Recharge/Discharge Sediment/Toxicant/Pathogen Retention Nutrient Removal Production Export
1-G	PFO	0.19	Groundwater Recharge/Discharge Floodflow Alteration Sediment/Toxicant/Pathogen Retention Production Export Sediment/Shoreline Stabilization Wildlife Habitat
2	WUS	---	---
2A	PEM/PFO	0.47	Floodflow Alteration Sediment/Toxicant/Pathogen Retention Nutrient Removal Production Export
2B	PFO	0.13	Groundwater Recharge/Discharge Nutrient Removal Production Export Wildlife Habitat
2C	PFO	0.13	Groundwater Recharge/Discharge Nutrient Removal Production Export Wildlife Habitat

TABLE III-9 Wetland Characteristics (Continued)

Wetland Number	Cowardin Classification	Wetland Size (acres)	Principal Functions
3	PFO	0.17	Groundwater Recharge/Discharge Floodflow Alteration Sediment/Toxicant/Pathogen Retention Nutrient Removal Production Export Sediment/Shoreline Stabilization Wildlife Habitat Visual Quality/Aesthetics
4	PEM/PSS	0.11	Groundwater Recharge/Discharge Floodflow Alteration Sediment/Toxicant/Pathogen Retention Nutrient Removal Production Export Sediment/Shoreline Stabilization Wildlife Habitat Visual Quality/Aesthetics
7	PEM/PFO	0.51	Groundwater Recharge/Discharge Floodflow Alteration Sediment/Toxicant/Pathogen Retention Nutrient Removal Sediment/Shoreline Stabilization Visual Quality/Aesthetics
8	PFO	0.05	Groundwater Recharge/Discharge Floodflow Alteration Sediment/Toxicant/Pathogen Retention Nutrient Removal Production Export Sediment/Shoreline Stabilization Visual Quality/Aesthetics
10	PFO	0.17	Groundwater Recharge/Discharge Floodflow Alteration Nutrient Removal Sediment/Shoreline Stabilization Wildlife Habitat
11	PFO	0.05	No Principal Functions
12	PFO	0.38	Groundwater Recharge/Discharge Floodflow Alteration Sediment/Toxicant Retention Nutrient Removal Production Export Sediment/Shoreline Stabilization
13	PEM/PSS	0.25	Groundwater Recharge/Discharge Floodflow Alteration Sediment/Toxicant Retention Nutrient Removal Sediment/Shoreline Stabilization
18	PEM/PSS	0.06	Groundwater Recharge/Discharge Floodflow Alteration Sediment/Toxicant/Pathogen Retention Nutrient Removal Wildlife Habitat
19	PFO	0.02	No Principal Functions

According to the *Montgomery County, Maryland Soil Survey Interim Report* (USDA, 1990), Hatboro silt loam (54A) soils underlie that portion of Hawlings River within the project area. This soil type, commonly found on floodplains, is described as being very deep and poorly drained. No one particular soil type appears to underlie any of the three unnamed tributaries to Hawlings River.

Wetland Nos. 1-C, 1-D, 1-F, 1-G, 2-B, 2-C, 3, 8, 10, 11, 12, 19

These wetlands are all classified as palustrine forested, broadleaved deciduous (PFO1), and are associated with either Reddy Branch or the unnamed tributary to Hawlings River. The dominant vegetation within these forested wetland areas primarily includes red maple (*Acer rubrum*) in the overstory and spicebush (*Lindera benzoin*) in the understory. Other species typically found in one or more of these areas include black willow (*Salix nigra*), American sycamore (*Celtis occidentalis*), and green ash (*Fraxinus pennsylvanica*). The hydrophitic criterion is satisfied within these wetland areas, as greater than 50 percent of the dominant species are considered facultative or wetter. Soil borings in these areas revealed the presence of hydric soils as evidenced by a low matrix chroma and/or evidence of hydric soil indicators such as mottling. Hydrology indicators throughout these areas included visual observation of saturation or inundation of soils, drift lines, oxidized root channels, water-stained leaves, morphological plant adaptations, or wetland drainage patterns.

Wetland Nos. 1-B, 2-A

Both of these wetlands are classified as palustrine emergent, persistent wetlands (PEM1). Wetland 1-B is located on the Reddy Branch floodplain, just north of Brighton Dam Road. Dominant vegetation within this wetland includes nepal microstegium (*Eulalia viminea*), tall goldenrod (*Solidago altissima*), and flat-top fragrant goldenrod (*Euthamia graminifolia*). Wetland 2-A, located in the northern portion of the project area, just west of MD 97, is dominated by Canada clearweed (*Pilea pumila*), creeping jenny (*Lysimachia nummularia*), goldenrod (*Solidago spp.*), and spotted touch-me-not (*Impatiens capensis*). In addition, this wetland has a small forested component associated with it, immediately south of the dominant emergent portion. Hydric soil indicators for these wetlands included low chromas, mottling, and/or gleying. Hydrology indicators included inundation, saturation of soils, oxidized root channels, hummocking, and/or wetland drainage patterns.

Wetland No. 1-A

Wetland 1-A is classified as both a palustrine emergent, persistent, seasonally saturated wetland (PEM1E) and a palustrine scrub shrub, broad-leaved deciduous, seasonally saturated wetland (PSS1E). This vegetated wetland area is situated around an open water pond, and receives flow from a small connected tributary. The pond then drains from south to north via an unnamed tributary to Reddy Branch. Dominant vegetation within the emergent portion includes soft rush (*Juncus effusus*), straw-color flatsedge (*Cyperus strigosus*), and bushy seedbox (*Ludwigia alternifolia*). The scrub-shrub portion of this system is fringe vegetation around an open water pond and is dominated by black willow. Soil profiles revealed the presence of oxidized root channels and wetland drainage patterns.

Wetland 1-E

Wetland 1-E was originally classified as both a palustrine, aquatic bed, floating-leaved wetland (PAB4), and a small, palustrine forested, broad-leaved deciduous, seasonally saturated wetland (PFO1E). A review of this wetland as part of the jurisdictional determination with the USACOE revealed that the aquatic bed portion of this area has converted to an emergent (PEM) area. This wetland is located east of MD 97, and is hydrologically connected to an unnamed tributary to Reddy Branch that flows from north to south. It appears that the emergent portion of this wetland was ponded at one time, as this area appears to have been bermed. The forested portion of the wetland is located in the northern portion of the area and consists primarily of red maple. This wetland exhibited soils with low chromas as well as several hydrology indicators including water-stained leaves, hummocking, and wetland drainage patterns. The forested portion of the wetland appears to be receiving hydrologic input from a hillside seep at the northern limit of the wetland.

Wetland 4

Wetland 4 consists of two wetland classifications including palustrine emergent, persistent, seasonally saturated (PEM1E) and palustrine scrub-shrub, broad-leaved deciduous, seasonally saturated (PSS1E) wetlands. This wetland is located in the central portion of the project area, east of MD 97, and on the southern floodplain of Reddy Branch. Dominant vegetation within the wetland includes nepal microstegium, Canada wood-nettle (*Laportea canadensis*), spotted touch-me-not, and black willow. The soils within the wetland exhibited low chroma and mottles throughout the profile. Although the soils were not quite saturated, they were very moist to the surface. Hydrology is provided by roadside runoff settling into this relatively large, depressional area. In addition, this wetland also receives hydrologic input from groundwater. Hydrology indicators observed on site included oxidized root channels and wetland drainage patterns.

Wetland 7

Wetland 7 is classified as both a palustrine emergent, persistent, seasonally saturated wetland (PEM1E) and a palustrine forested, broad-leaved deciduous, seasonally saturated wetland (PFO1E). This wetland is located within the central portion of the project area, on the east side of MD 97, and north of Brighton Dam Road. This floodplain wetland consists of a fallow, open field, and an adjacent forested area. The wetland/upland boundary within the field area follows a well-defined vegetation break. The wetland area contained creeping jenny, an obligate herbaceous species, fox sedge (*Carex vulpinoidea*), and several large black willows. In addition, the wetland area also exhibited hydric soil indicators including low chroma and mottles within 18 inches of the surface. Supporting hydrology is provided primarily by a channelized unnamed tributary (located south of the wetland and south of Brighton Dam Road), which carries flow to this wetland. As the tributary crosses under Brighton Dam Road, the stream is no longer channelized and diffuses water over the wetland.

Wetland 13

Wetland 13 is classified as both a palustrine emergent, persistent, seasonally saturated wetland (PEM1E) and a palustrine scrub-shrub, broad-leaved deciduous, seasonally saturated wetland (PSS1E). This wetland is located on the west side of MD 97, immediately east of Meadow Branch.

Dominant vegetation within this wetland includes spicebush, sedge (*Carex spp.*), rice cut-grass (*Leersia oryzoides*), American sycamore (*Platanus occidentalis*), smooth alder (*Alnus serrulata*), and spotted touch-me-not. The soils sampled on site exhibited low chromas and mottles throughout the profile with oxidized root channels observed in the upper profile. Hydrology supporting this wetland is provided by an unnamed intermittent stream channel that diffuses water over the wetland and allows water to settle within the broad, flat area. The wetland also receives hydrologic input from the groundwater during wetter seasons. Hydrology indicators observed within the wetland include saturation, hummocking, oxidized root channels, and wetland drainage patterns. This wetland is hydrologically connected to the adjacent unnamed tributary to Reddy Branch.

Wetland 18

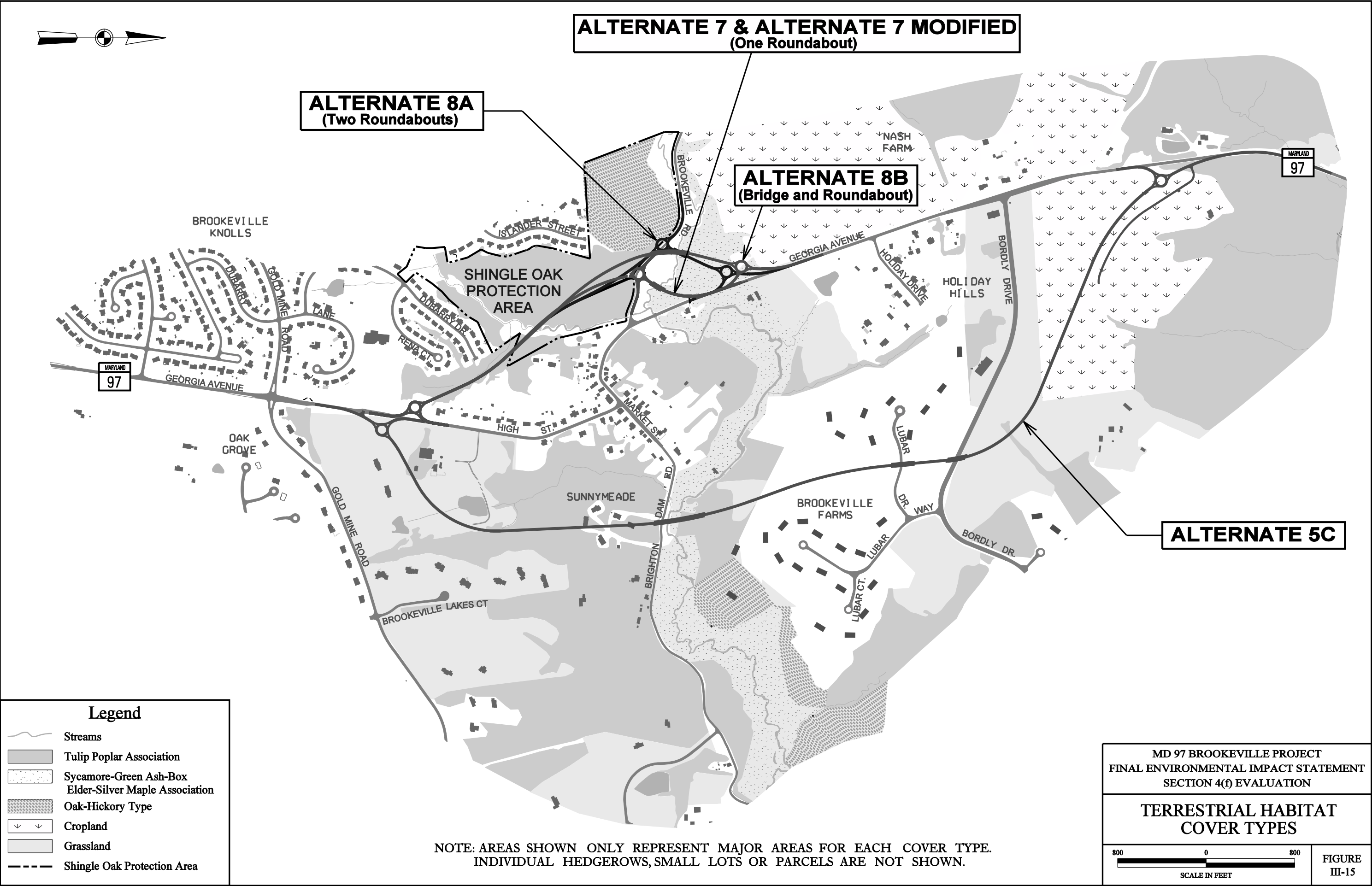
Wetland 18 is classified as both palustrine emergent, persistent, seasonally saturated (PEM1E) and palustrine scrub-shrub, broad-leaved deciduous, seasonally saturated (PSS1E) wetland. This wetland is located in the extreme western portion of the project area, south of Brookeville Road. Dominant vegetation within this wetland includes spotted touch-me-not, soft rush, and arrow-wood (*Viburnum dentatum*). Soils sampled on site revealed low chroma readings at depths exceeding 20.3 cm (8 inches) and mottles throughout the soil profile. Hydrology appears to be supported by surface runoff, groundwater inputs, and possible floodflows from Reddy Branch. Hydrology indicators observed on site include oxidized root channels throughout the soil profile, hummocking, water-stained leaves, and wetland drainage patterns.

J. VEGETATION AND WILDLIFE

1. Vegetation

Five vegetative community types were identified throughout the project area: Tulip Poplar Forest Association (*Liriodendron tulipifera*), Sycamore-Green Ash-Box Elder-Silver Maple Forest Association (*Platanus occidentalis*, *Fraxinus pennsylvanica*, *Acer negundo*, and *Acer saccharinum*), Oak-Hickory Forest Type, Cropland and Grassland (**Figure III-15**). The project area has been identified in *The Vegetation Map of Maryland* (Brush *et al.*, 1977) as being dominated by the Tulip Poplar Forest Association and, to a much lesser extent, the Sycamore-Green Ash-Box Elder-Silver Maple Forest Association. One other forest type, Oak-Hickory, has been included as well but is not considered as a separate forest association by Brush (Brush, *et. al.*, 1977). The Oak-Hickory cover type within the Piedmont typically refers to the white oak (*Quercus alba*), black oak (*Quercus velutina*), northern red oak (*Quercus rubra*), pignut hickory (*Carya glabra*), and mockernut hickory (*Carya tomentosa*) as the associate canopy species.

Forest cover, especially large contiguous forest cover, is dominant along Reddy Branch and along other waterways along second and third order tributaries leading to Reddy Branch as well as along steep slopes. Forest remnant patches and hedgerows are evident throughout the project area along property lines and roadways. Cropland, primarily dominant in the central portion of the project area, consists of hay meadows, corn, soybean, and other farm crops. Grasslands are limited to non-forested fallow fields and maintained turf areas. A description of each community, including their locations, follows.



Tulip Poplar Forest Association

The dominant forest cover in the project area is the Tulip Poplar Forest Association. This forest cover type comprises approximately 30 percent of the entire project area. Tulip poplar forests are common to moist or mesic sites. Even though this species is often found in small patches, large uninterrupted and often pure stands of poplar are common. This is evident throughout the project area. Examples of pure stands are evident along the southeastern portion of the project area (immediately north of Reddy Branch) and immediately south of Brighton Dam Road. This species dominance is temporary in a successional scale due to an intolerance of shade. Subsequently, there are small patches where oaks are dominant among a larger tulip poplar dominated stand. Areas that are typically xeric, such as on rocky slopes, are more oak dominated.

The tulip poplar forest stands identified in the project area include a wide range of successional stages and ages. Stands range from early and almost pure 40+ year-old poplar stands to mixed aged stands of oaks and poplar, with a large portion of trees estimated to be 60-70 years old. However, there are many trees, mostly oaks, estimated to be over 100 years old.

Tulip poplars 24 inches and greater were commonplace in several stands, especially along Brighton Dam Road and in the northern portion of the project area. Trees over 35 inches in diameter at breast height (DBH) are predominantly either along forested riparian corridors, lower portions of forested steep slopes, or as individual trees on residential properties.

Several localized populations of shingle oak (*Quercus imbricaria*) were identified throughout the project area, primarily within portions of early stage tulip poplar dominated forests. Shingle oak is currently included in the DNR, Wildlife and Heritage Division's List of Rare, Threatened, and Endangered Plant Species as a state watchlist candidate. The watchlist status is not provided legal protection by the DNR and is defined as an uncommon species which is thought to be secure in the state, but that is being monitored in order to fully determine whether enough populations exist before the DNR removes the species from the list. The protection area for this species is more appropriately described as a Unique and Sensitive Area. The protection area as well as tulip poplar forests containing shingle oaks are not afforded any special protection by DNR. The terrestrial habitat field survey has identified several populations, other than those identified within the protection areas, primarily along the upland slopes adjacent to Reddy Branch east of MD 97 and upland woodlands east of MD 97 and south of Brighton Dam Road.

Sycamore-Green Ash-Box Elder-Silver Maple Forest Association

This forest association is common along the floodplains of streams and rivers throughout the Piedmont. Within the project area, this forest association is evident throughout the 100-year floodplain of Reddy Branch and several of the tributaries leading to Reddy Branch, accounting for six percent of the project area.

No one canopy species is dominant throughout the floodplain. The dominance of any one of these species is typically limited to small patches or sections along the floodplain. Common understory tree and shrub species include ironwood (*Carpinus caroliniana*), spicebush, greenbriers (*Smilax spp.*), and multiflora rose (*Rosa multiflora*).

According to the *Maryland Forest Conservation Manual* (Metropolitan Washington Council of Governments, 1991), plant species common to these associations have been provided in tables included in **Appendix E**.

Oak-Hickory Forest Type

The areas that have been identified as oak-hickory are evident along rocky slopes and are adjacent to tulip poplar stands. Many of the understory species evident in the oak-hickory forests are similar to those listed in the Tulip Poplar Forest Association, especially flowering dogwood (*Cornus florida*) and southern arrowwood (*Viburnum dentatum*). These forests represent a small portion (three percent) of the project area.

A significant tree report was submitted to the SHA in November 1995, briefly describing the forest communities and included a list of all the significant and/or champion trees identified within the project area including the approximate location of each tree (KCI Technologies, 1995). Significant trees are defined as those trees that are either 75 percent of the DBH of the known state champion tree for individual species or are 35 to 40 inches DBH or greater. The selection of trees with a DBH greater than 35 to 40 inches was based on the uniqueness of this size for all tree species within the project area. Often, trees with a DBH of 24 inches have been the size of interest relevant to laws such as the Maryland Forest Conservation Act; however, this is a common DBH for certain species to attain (such as tulip poplar).

Champion trees are those trees that are known to be the largest of that species in the State of Maryland based on the *Big Tree Champions of Maryland* (Prenger and Brook, 1990). A total of 133 trees were identified that were considered significant trees. Most of these trees are located along the floodplain of Reddy Branch or on private residential properties.

Cropland

Areas dominated by cropland are primarily limited to the northern portion of the project area, along MD 97. Typical crops include hay, corn, soybean, and other farm crops.

Grassland

The grasslands are those non-forested areas that have recently been left fallow or are maintained turf. Large parcels of grasslands include fallow farm fields dominated by a variety of herbaceous vegetation such as grasses (*Poa spp.*), multiflora rose, and goldenrod. Examples of this are the fields immediately north of the Holiday Drive subdivision. One grassland parcel located immediately east of the Holiday Drive subdivision has recently been largely converted to individual single-family homes. Smaller parcels of grasslands from one acre in size or less are evident throughout the project area including individual private residences. Many examples of this vegetative community, if not maintained, will revert to forest cover.

2. Wildlife

Fauna surveys within the project area were conducted in May and June of 1997. Techniques used to identify the presence of wildlife included direct visual/audible observations and indirect observations such as the presence of tracks, cavities, nests, fecal material, carcasses, etc. In addition, information was obtained from the DNR on potential species likely to be identified within the project area. Other sources included a review of field guides and professional judgment. Wildlife observed throughout all five terrestrial habitats includes avian species, reptiles, amphibians, and mammals.

a. Terrestrial Wildlife

The forest cover in the project area, based on the number and size of large, mature stands, as well as, the diversity of native species serves as important habitat for a diversity of wildlife species. The value of the terrestrial habitat and species likely to inhabit these areas, especially the forest cover, is improved by the proximity of adjacent habitats such as floodplains, wetlands, and streams. In addition, according to the DNR, the forests within the project area contain Forest Interior Dwelling Birds (FIDB) habitat, and the conservation of this habitat is strongly encouraged. Correspondence from DNR is included in **Section VI**.

Terrestrial wildlife known to associate with these types of habitats includes a diversity of songbirds including migratory songbirds, FIDB, raptors, amphibians and reptiles, and mammals. Wildlife or signs of wildlife that were observed as part of the field surveys are listed in a table in **Appendix E**. In general, species observed represent those types of wildlife that benefit from various forms of habitat including forest cover and open fields. Examples of these species include white-tailed deer (*Odocoileus virginianus*), Eastern chipmunk (*Tamias striatus*), red-shouldered hawk (*Buteo lineatus*), blue jay (*Cyanocitta cristata*), American kestrel (*Falco sparverius*), and Carolina chickadee (*Parus carolinensis*).

b. Aquatic Wildlife

A survey of the aquatic resources, limited to ponds, wetlands with standing water, and streams, especially Reddy Branch, was conducted in May and June 1997 as well as previous visits as part of the wetland delineation process conducted in 1995. No formal habitat evaluation methodology or sampling of fish species or other aquatic life was conducted for the ponds. In general, the ponds are located on private property, primarily farms. The ponds are typically surrounded by maintained grass with a narrow fringe of emergent and woody wetland vegetation along the edge of the pond. Fish species likely to be present in the ponds would include largemouth bass (*Micropterus salmoides*) and bluegills (*Lepomis macrochirus*).

Cursory fish sampling of Reddy Branch was conducted and revealed the presence of blacknose dace (*Rhinichthys atratulus*), rosieside dace (*Clintostomus funduloides*), common shiner (*Notropis cornutus*), and a mottled sculpin (*Cottus bairdi*). More detailed data regarding fish species within the project area was obtained from the DNR.

Table III-10 lists resident fish species identified within the Hawlings River in a survey conducted by the University of Maryland between 1966 and 1977.

Table III-10 – Hawlings River Fish Species Likely to Reside and Spawn in Reddy Branch

Common Name	Scientific Name	Common Name	Scientific Name
Blacknose dace	<i>Rhinichthys atratulus</i>	River chub	<i>Nocomis micropogon</i>
Bluegill sunfish	<i>Lepomis macrochirus</i>	Rosyside dace	<i>Clinostomus funduloides</i>
Common shiner	<i>Notropis cornutus</i>	Satinfin shiner	<i>Notropis analostanus</i>
Cutlip minnow	<i>Exoglossum maxillingua</i>	Shield darter	<i>Percina peltata</i>
Fallfish	<i>Semotilus corporalis</i>	Spottail shiner	<i>Notropis hudsonius</i>
Green sunfish	<i>Lepomis cyanellus</i>	Stripeback darter	<i>Percina notogramma</i>
Golden shiner	<i>Notemigonus crysoleucas</i>	Swallowtail shiner	<i>Notropis procne</i>
Longnose dace	<i>Rhinichthys cataractae</i>	Smallmouth bass	<i>Micropterus dolomieu</i>
Largemouth bass	<i>Micropterus salmoides</i>	Tessellated darter	<i>Etheostoma olmsted</i>
Margined madtom	<i>Noturus insignis</i>	White catfish	<i>Ictalurus catus</i>
Northern hogsucker	<i>Hypentelium nigricans</i>	White sucker	<i>Catostomus commersoni</i>
Redbreast sunfish	<i>Lepomis auritus</i>		

It is likely, based on recent DNR correspondence (**Section VI**) that many of the species listed in **Table III-10** reside and spawn in Reddy Branch. Anadromous fish are not present in the project area as Rocky Gorge Dam (located downstream of the project area) serves as a barrier to fish passage to further upstream. A listing of fish species that were collected in the larger Patuxent River basin between 1974 and 1984 is provided in **Section VI**.

A more detailed evaluation of the habitat conditions, primarily within Reddy Branch, focused on the presence of aquatic macroinvertebrates. These organisms vary in their tolerance to changes in water quality, such as sedimentation and pollutants, and the presence or absence of these organisms is a good indicator of water quality, as well as, potential habitat for a variety of aquatic life.

Macroinvertebrate sampling was conducted in 1997 at five sampling locations along Reddy Branch and other perennial streams within the project area where stream crossings are proposed for the different alternates (**Figure III-16**). Monitoring Station #1 is at Reddy Branch and is situated along stream riffles upstream and downstream of the bridge over Reddy Branch along Brookeville Road. Station #2 is along Reddy Branch on the north side of Brookeville Road approximately where Alternate 8A and Alternate 8B will cross the stream. Monitoring Station #3 is along the north side of Brighton Dam Road, downstream of a WSSC pumping station and Station #1 and #2, where Alternate 5C would cross Reddy Branch. As a control point for future monitoring efforts, Monitoring Station #4 is situated along an unnamed tributary to Reddy Branch north of Brighton Dam Road. Station #5 is located along Reddy Branch north of Brighton Dam Road, downstream of all other monitoring stations and the proposed crossings associated with Alternate 7, Alternate 8A, and Alternate 8B.

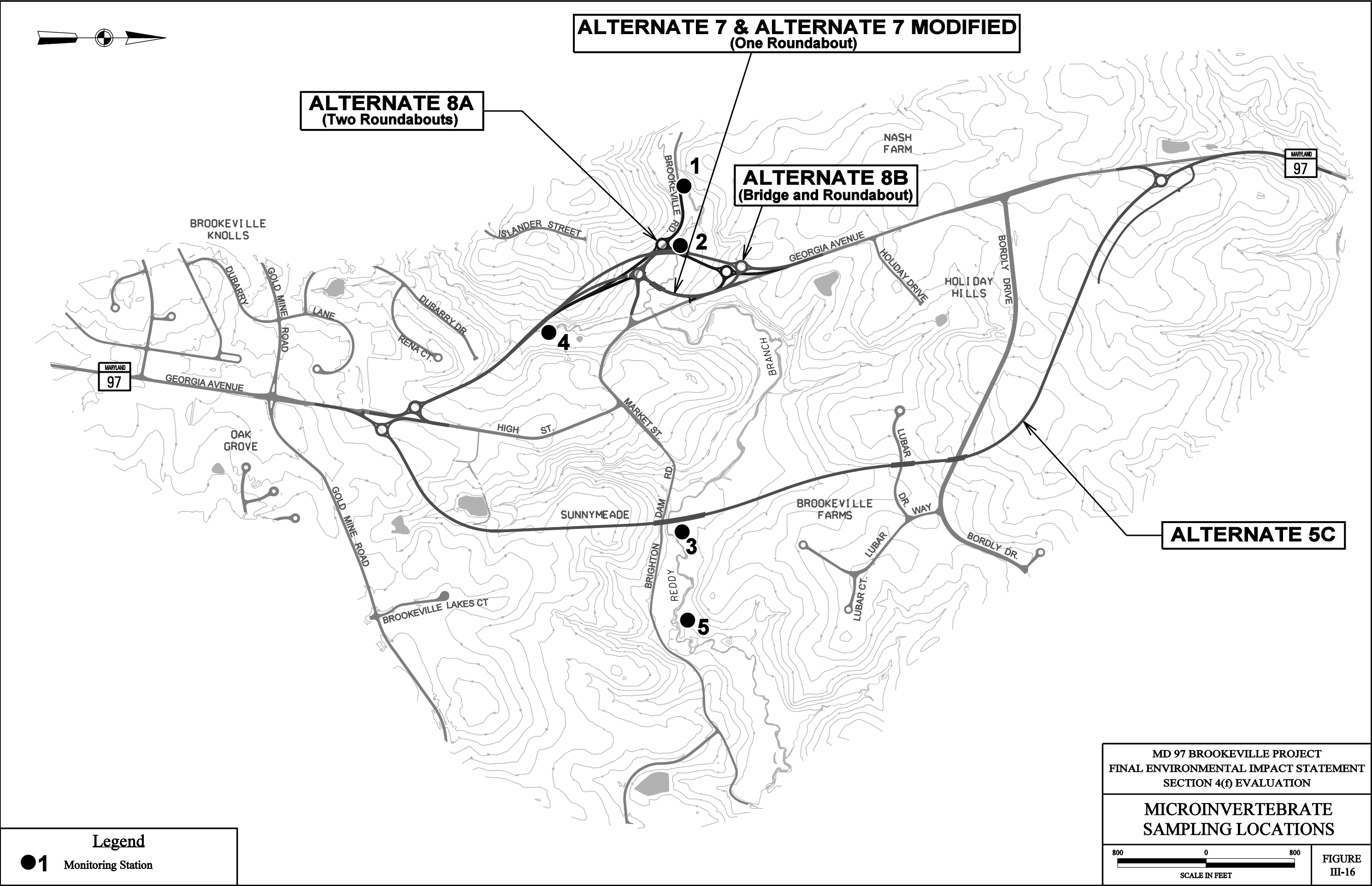
Macroinvertebrate sampling techniques followed the procedures described in the Maryland Save Our Streams (MD-SOS) Project Heartbeat Sampling Procedures (MD-SOS, 1994), which are a modification of the USEPA Rapid Bioassessment Protocol Level II (RBP II) (USEPA, 1989). The MD-SOS methodology utilizes systematic field collections of the benthic macroinvertebrate community of a stream, followed by the laboratory identification of major benthic taxa to the family taxonomic level. The results were then used to analyze the overall health and water quality of the streams.

Organisms in each sample were later quantified and identified to the family taxonomic level in the laboratory and classified according to functional feeding groups and tolerance to pollutants. Functional feeding group classifications and tolerance values were provided by the MD-SOS (1996) and Hilsenhoff (1998).

Data analysis of the macroinvertebrate samples aids in the evaluation of biotic integrity based on community, population, and functional parameters known as “metrics” (USEPA, 1989). Metrics are numerical values used to measure various components of benthic community structure, including pollution sensitivity. Although the USEPA has determined 23 distinct metrics relevant to pollution detection, the MD-SOS has further reduced the metrics to six core metrics, which appear to reveal the most significant information about stream quality in the Mid-Atlantic Piedmont and Coastal Plain region. These metrics include: 1) taxa richness (TOTAX), 2) pollution sensitivity as measured by the modified family biotic index (FBI), 3) ratio of Ephemeroptera, Plecoptera, and Trichoptera and Chironomidae abundances (EPT:CHIRO), 4) percent contribution of the dominant family (DOMTOT), 5) number of EPT taxa present (EPTTAX), and 6) percent contribution of EPT individuals (EPTTOT).

After the organisms from the field samples were identified and quantified, the results were transformed into the series of six core metrics. Each metric was then compared to metric values calculated for reference stream conditions in order to determine the overall biological condition of each monitoring station. Reference streams are streams located in the same eco-region that have similar physical and biological characteristics to the study streams. For this study, data from the MDE’s “Biological Reference for the Patuxent Piedmont” was utilized for comparison (MDE, 1996).

Bioassessment of the streams was completed by comparing the total biological condition score calculated for each monitoring station to the reference condition score. Each station was assessed as either “non-impaired”, “moderately impaired”, or “severely impaired”, in comparison to the reference stream conditions. A “non-impaired” stream is one that is comparable to the best situation to be expected within the ecoregion, consisting of a balanced community of pollution intolerant and tolerant taxa, with optimum community structure (composition and dominance). A “non-impaired stream equates to a stream with an overall biological condition score that is greater than 79 percent comparable to the reference streams score. “Moderately impaired” streams range from 29 percent to 72 percent comparable to reference conditions and are characterized by fewer species due to the loss of most pollution intolerant (EPT) organisms. Streams considered “severely impaired” are less than 21 percent comparable to reference conditions, and typically have few species present, are dominated by one or two taxa, and the majority of the organisms consist of representative from pollution tolerant taxa.



Based upon field evaluations of the quality and quantity of available aquatic habitat within Reddy Branch, including substrate and in-stream cover, channel morphology, and riparian zone/bank stability habitat components, Reddy Branch appears to be capable of partially supporting an acceptable level of biological health. In general, the results of the bioassessment indicate that the portion of Reddy Branch within the MD 97 project area is considered “moderately impaired” in comparison to reference stream conditions. Reaches of the stream and its tributaries that are near roads, yards, or other urban influences appear to be impaired to a greater degree than reaches further from the urban influence. The stream impairment is likely due to a combination of water quality problems caused by runoff from the roads, farms, and urban/suburban areas, as well as, less than optimal habitat in certain reaches of the stream. Qualitative and quantitative data sheets for benthic macroinvertebrates and MD-SOS Bioassessment Data Summary Sheets are in **Appendix F**.

3. Rare, Threatened, and Endangered Species

According to the USFWS, no federally listed or proposed endangered or threatened species are known to exist in the project area. In correspondence, DNR, Wildlife and Heritage Division reported no records for federal or state rare, threatened, or endangered plants or animals within the project area, however, there are several small American chestnut (*Castanea dentata*) trees within the western portion of the study area. This species is listed as a state rare or uncommon plant species by DNR. However, based on coordination with DNR, only large mature flowering chestnut trees are typically monitored. It is common to find small chestnut trees throughout portions of Montgomery County. The majority of these trees succumb to the chestnut blight before becoming mature and reaching a flowering stage.

4. Unique and Sensitive Areas

The Maryland Natural Heritage Program of the DNR has identified a section of Reddy Branch Stream Valley Park west of Brookeville and south of Brookeville Road as a protection area for shingle oak (**Figure III-15**). According to a previous inventory conducted by the Maryland Natural Heritage Program, this species was observed scattered along Reddy Branch and adjacent uplands (Bartigis, *et al.*, 1993). During field surveys conducted for the terrestrial habitat evaluation, shingle oaks were identified throughout the project area. The shingle oak is currently included in the DNR, Wildlife and Heritage Division’s List of Rare, Threatened, and Endangered Plant Species as a state watchlist candidate. The watchlist status is not provided legal protection by the DNR and is defined as an uncommon species which is thought to be secure in the state, but that is being monitored in order to fully determine whether enough populations exist before the DNR removes the species from the list. Subsequently, the protection area for this species is more appropriately described as a Unique and Sensitive Area.

K. AIR QUALITY

The project area is located in Montgomery County, Maryland. This county is designated as an attainment area for carbon monoxide (CO), Nitrogen Dioxide (NO₂), Sulfur Dioxide (SO₂), Lead (Pb) and particulate matter (PM₁₀), but is designated as a serious non-attainment area for ozone (O₃). Since the project area is designated non-attainment for ozone, the region is subject to transportation control measures such as the Vehicle Emissions Inspections Program.

A detailed microscale air quality analysis has been performed to determine the local CO impact of the proposed project. The location of air quality sensitive receptors in the project area is identified in **Table III-11**, and the receptors for each Build Alternate are located on **Figure III-17** (Page III-59). The results of the air quality analysis are summarized in **Table IV-12** and **Table IV-13** included in **Section IV** (Environmental Consequences).

TABLE III-11 Location of Air Quality Sensitive Receptors

Receptor	Location	Description
AQ-1	19544 Dubarry Drive	2-Story Brick Residence
AQ-2	318 Market Street (MD 97)	2-Story Stone Residence
AQ-3	19645 Islander Street	Yellow Split-Level Residence
AQ-4	20300 Georgia Avenue (MD 97)	1-Story Brick Residence
AQ-5	2821 Gold Mine Road	2-Story Brick Residence
AQ-6	28 High Street (MD 97)	1-1/2-Story Brick Residence
AQ-7	19500 Georgia Avenue (MD 97)	1-Story White Frame Residence
AQ-8	3 Church Street	Gray Ranch Residence
AQ-9	2705 Gold Mine Road	2-Story Brick Residence
AQ-10	19424 Brookeville Lake Court	2-Story Dutch Colonial Residence
AQ-11	200 Market Street	2-Story White Frame Residence
AQ-12	Sta. 62+00 Right Alternate 5C	Edge of ROW
AQ-13	307 Market Street (MD 97)	2-Story Brick Historic Residence
AQ-14	Sta. 59+80 Right Previous Alternate 3A	Edge of ROW
AQ-15	Sta. 59+60 Right Previous Alternate 4B	Edge of ROW
AQ-16	Sta. 82+50 Left Alternate 5C	Edge of ROW
AQ-17	Sta. 93+30 Left Alternate 5C	Edge of ROW

A copy of the MD 97 Project's Air Quality Technical Analysis Report is available at the State Highway Administration, 707 North Calvert Street, Baltimore, Maryland 21202.

L. NOISE ANALYSIS

The FHWA has established procedures and criteria to determine and evaluate impacts associated with vehicular use of roadways. The primary problems associated with highway noise are activity interference and general annoyances. Therefore, it is the goal of abatement programs to minimize these impacts to exterior land uses.

The decibel is the basic unit of sound measurement. Decibels are units that represent relative acoustic energy intensities. Because the range of energy found throughout the spectrum of normal hearing is so wide, the numbers necessary to define these levels must represent huge variations in energy. To compensate for this wide range of numbers, a base 10 logarithmic scale is used to make the numbers more “normal.”

Traffic noise is the sound generated by automobiles and trucks on streets and highways. The sound generated is composed of tire, engine, and exhaust noise. People respond differently to sound energy in varying acoustic frequency ranges. Sounds heard in the environment usually consist of a range of frequencies, each at a different level. The method of correlating human response to equivalent sound pressure levels at different frequencies is called “weighting.” The weighting system used to correlate human hearing to frequency response is the “A-weighting scale” and the resultant sound pressure level is called “A-weighted sound pressure level.” This is generally abbreviated by the expression dB(A). The A-weighted decibel scale dB(A) is generally used in assessing community noise exposure because this scale closely approximates the frequency response of the human ear.

The A-weighted equivalent sound level (Leq) is the descriptor used most frequently in highway noise analyses. The Leq is the equivalent steady state sound level which represents the mean energy or sound intensity level for a given time period.

Noise sensitive areas were identified previously by the SHA and verified through field visits as part of the July 1997 Technical Noise Analysis Report prepared during the early stages of the project and updated for the March 2001 Technical Noise Analysis Report. A copy of this technical report is available at the State Highway Administration, 707 North Calvert Street, Baltimore, Maryland 21202. The noise sensitive locations include single family and multi-family residences, a ball field and parklands. The Noise Sensitive Areas (NSAs) are displayed on **Figure III-17** and are described as follows:

NSA 1

NSA 1 represents the area west of Alternate 7 and Alternate 8, including subdivisions along Dubarry Lane, Dubarry Drive, Rena Court, and Islander Street, between Gold Mine Road and the PEPCO power line. There are approximately 39 single-family residences in the area.

NSA 2

NSA 2 represents the area east of Alternate 5C, including the subdivision along Brookeville Lakes Court, and two proposed subdivisions on both sides of the PEPCO power line. There are approximately 12 existing single-family residences and 17 proposed residential lots in the area.

NSA 3

NSA 3 represents the area between the proposed eastern and western Alternates and south of the Reddy Branch including most of the Brookeville Historic District. There are approximately 48 single-family residences in the area. Most of NSA 3 is within the historic district boundary.

NSA 4

NSA 4 represents the area between the proposed eastern and western Alternates and north of Reddy Branch, including a subdivision along Holiday Drive and a proposed subdivision. There are approximately 15 single-family residences and 5 planned lots in the area.

Using the FHWA's Traffic Noise Prediction Model (TNM), receptor sites within the study area were analyzed for all four NSAs in the study area. A total of 78 receptors were included in the study area for each alternate. These receptor locations are based on the locations analyzed during the April 1997 Technical Noise Analysis. The receptor locations provide a full representation of the study area and the NSAs. The existing noise levels varied from an Leq of 39 to 68 dBA. A summary of the existing noise levels for each receptor is shown in **Table III-12**.

M. MUNICIPAL, INDUSTRIAL, AND HAZARDOUS WASTE SITES

1. Background Research

An existing data search was conducted using the Environmental Risk Information and Imaging Services (ERIIS) and a report was completed in June of 1997. The following databases were used during the background research:

- National Priority List (NPL)
- Resource Conservation & Recovery Information System - Corrective Action Sites (RCRIS CA)
- Resource Conservation & Recovery Information System - Treatment, Storage and Disposal Facilities (RCRIS TS)
- Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS)
- No Further Remedial Action Planned Sites (NFRAP)
- Resource Conservation & Recovery Information System - Large Quantity Generators (RCRIS LG)
- Resource Conservation & Recovery Information System - Small Quantity Generators (RCRIS SG)
- Emergency Response Notification System (ERNS)
- Maryland Notice of Potential Hazardous Waste Sites (HWS)
- Maryland Active Recovery Sites List (LRST)
- Maryland Permitted Solid Waste Facilities (SWF)
- Maryland Underground Storage Tank Report (RST)

2. Preliminary Results

The ERIIS Report listed four recorded underground storage tank sites within the study area. These are shown on **Figure III-17** on Page III-59. Each of the five sites has a Brookeville address. Each of these contains either gasoline, oil, or diesel fuel. No other potentially contaminated sites were found within the project area.

TABLE III-12 Existing Noise Levels

Noise Sensitive Area (NSA)	Receptor	Existing Noise Level	Noise Sensitive Area (NSA)	Receptor	Existing Noise Level
1	3	48	3	4	62
	1A	45		5	64
	1B	46		2A	51
	1BB	44		2B	63
	1C	39		6A	47
	3B	46		6B	47
	3C	47		6C	67
	4A	63		6D	53
	4B	62		6E	55
	4C	68		6F	63
	5D	59		6G	65
	5E	53		7A	61
	5F	52		7B	54
	5G	52		7F	63
	5H	63		8A	50
	5I	59		8B	47
	7C	52		9E	50
	7D	47		11A	54
	7E	59		11B	52
2	1	41	3	13A	55
	2	63		13B	53
	5A	52		13C	51
	5B	45		13D	69
	5C	48	4	6	64
	9A	51		4D	53
	9B	48		4E	55
	9C	42		4F	45
	9D	40		11C	49
	10A	48		11D	48
	10B	48		11E	49
	10C	47		11H	47
	10D	47		11I	47
	10E	47		11J	48
	10F	42		11K	47
	10G	42		11L	46
	11G	47			
	12A	48			
	12B	47			
	12C	46			
	12D	46			
	12E	47			
	12F	49			
	12G	44			
	12H	45			
	12I	46			
	12J	43			
	12K	43			
	12L	44			

